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SUMMARY OF RECENT ABSTRACTS*

IV. TRYPANOSOMIASIS

African Trypanosomiasis

Epidemiology

Lapeyssonie (p. 123) has written, in French, a short general account of African trypanosomiasis.

Buxton (p. 1128) makes the point that the veterinary aspect of trypanosomiasis is often more important than the human disease. He comments on the successful settlement schemes which have been created in East and West Africa.

A conspectus of trypanosomiasis in East Africa has been written by Buxton (p. 231) and published for the British Colonial Office by H.M. Stationery Office. This is a companion report to that on West Africa by Davey (below). Buxton discusses current problems and research in relation to entomology, protozoology, human and veterinary medicine, and methods of reclamation and control. The statement and the argument show a grasp of detail and of broad principles which will ensure that the report will remain a standard of reference for a long time; like the others in the series, it should be read in the original.

Davey (p. 221) has made a survey of British West Africa, and reports on the extent of trypanosomiasis in man and animals, the species of trypanosomes, diagnosis, treatment, prophylaxis and control. He also refers to control methods used in the Sudan, French and Belgian territories, and Liberia. This comprehensive report, in which the author has assessed the importance of the disease, and of the methods of checking it, should be read in full; it is one of a series published by His Majesty's Stationery Office for the British Colonial Office.

A case of *T. rhodesiense* infection is reported from Kenya (near the Tanganyika border) by Heisch (p. 237), who observes that it was the first recorded from that country since 1942.

Lalouel (p. 1012) gives an account of the progress of trypanosomiasis in part of French Equatorial Africa from 1907 to 1948; there has been a considerable improvement in the position in recent years.

A comprehensive report on trypanosomiasis in man and animals in the Portuguese African territories has been made by Ferreira (p. 530). The

*The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1949, v. 46. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

common parasites, and their vector flies, are named for Angola, Portuguese Guinea and Mozambique. In the first two, human trypanosomiasis is more important than animal, but in Mozambique the reverse is the case. The report should be read in detail ; there is an English version.

A long report on the control of trypanosomiasis in Mozambique (p. 984) records the tsetse fly surveys made by the Portuguese special mission, the incidence of sleeping sickness (up to 4·3 per 1,000 in the most affected area) and of animal trypanosomiasis. Nagana is a very serious problem. The report gives much local detail, and discusses tsetse control and the game problem. The original abstract gives much of the detail, which will be particularly useful to those who do not read Portuguese.

In Portuguese Guinea there is a special organization for the study and control of sleeping sickness. FERREIRA (p. 1013) reports the number of people examined, and of cases found, in 1947 ; he records the finding of polymorphic trypanosomes in *G. palpalis*, *G. longipalpis* and *G. submorsitans*.

In Fernando Pó human sleeping sickness is due to *T. gambiense* and the vector is *G. palpalis*. GONZALEZ VICENTE (p. 124) reports that the health organization of the island aims at examination of the whole population every 3 months, and treatment of the infected. The incidence has been falling for several years.

Aetiology

In a discussion on the epidemiology of trypanosomiasis in man and animals (p. 235) CARMICHAEL referred to the trypanosomes of cattle, and the flies which transmit them. Tsetse flies tend to move into areas formerly free from them, and game animals bring in trypanosomes pathogenic to cattle. HOARE discussed the hosts of the trypanosomes pathogenic for man, and the relationship of *T. brucei* to *T. rhodesiense* and *T. gambiense*. LOURIE made the point that the characters of trypanosomes are not all fixed ; virulence may be enhanced by passage through suckling rats, or reduced by passage through sheep. Various other speakers took part in this discussion.

FAIRBAIRN and CULWICK (p. 812) have measured the length of large numbers of *T. rhodesiense*, *T. brucei* and *T. gambiense*, of various strains, both blood forms and metacyclic forms from tsetse flies, to find if there existed any significant differences. Their general results are set out in tables. There are significant differences between the mean measurements of certain strains, and between the metacyclic forms of the species, but some strains of *T. brucei* differed greatly from others of the same species. Human experiment once more showed that *T. brucei* does not infect man.

HORNBY (p. 811) discusses the electrical charge of trypanosomes, and does not agree that this can be deduced by observation of their position in relation to erythrocytes after blood has been spread on slides.

Accidental infection in a laboratory proved that a strain of *T. gambiense* maintained for 14 years in animals had retained its infectivity for man (LAUNOY, p. 337 ; NODENOT, p. 917).

The examination of trypanosomes in blood by the technique of fluorescence microscopy is described by STRUGGER (p. 237).

RUBIN (p. 920) describes a modification of the medium of Yorke, Adams and Murgatroyd for the maintenance of trypanosomes, and in which trypanocidal drug activity may be tested. In this medium he (p. 921) tested a group of antibiotic lactones and their analogues. The most promising was Furacin.

Transmission

A most comprehensive and up-to-date account of the tsetse flies of British West Africa has been written by NASH (p. 224), who deals with Nigeria, the Gold

Coast, Sierra Leone, and the Gambia separately, summing up West Africa as a whole at the end. The report is illustrated by 15 maps in colour and by 64 photographs. The habits of the various species of flies, the cattle they affect, the vegetation they haunt, the methods used for control, and suggestions for future research, are dealt with systematically. The author has summarized the literature on the different subjects, and has added the results of his own work and of that of other workers with whom he conferred while making his survey. The report should be read in detail ; it was published for the British Colonial Office by H.M. Stationery Office.

A summary of papers relating to the biology of tsetse flies has been written by JACKSON (p. 1014). This should be read in full ; it contains a valuable list of references.

JACKSON (p. 336) has continued his observations on tsetse flies released in country they do not normally inhabit (though not unsuitable to them), and has been able, therefore, to study age, reproduction, etc., with precision. Details should be sought in the original.

VANDERPLANK (p. 617) studied the relation between activity of *G. pallidipes* and certain climatic factors by observing the flies coming to a tethered ox, in East Africa. The details of this work should be sought in the original, but one important point may be mentioned, namely, that for several of the physical factors (heat, light, humidity) there was a critical value at which activity was most marked. For instance, brightness of the light stimulated activity up to a point, but brightness beyond that point reduced activity.

VANDERPLANK (p. 18) has continued his work on the cross-breeding of tsetse flies in the laboratory. The work should be read in the original.

VANDERPLANK (p. 1013) has differentiated three races of *G. submorsitans*, and a new subspecies of *G. morsitans*. He also reports his experiments in cross-breeding with various species. Two new subspecies of *G. palpalis* are also described. Differentiation of races and subspecies is largely made on morphological features of the male genitalia. The geographical distribution of these flies is indicated.

MOGGRIDGE (p. 337) has studied the night-biting habits of *G. austeni* on the coast of Kenya.

In the Upper Volta region of French West Africa VILAIN (p. 921) found that *G. palpalis*, *G. tachinoides* and *G. morsitans* comprised 95 per cent. of the tsetse flies found. He gives information on their distribution.

FERREIRA *et al.* (p. 1127) found polymorphic trypanosomes in *G. palpalis*, *G. submorsitans* and *G. longipalpis* in Portuguese Guinea (infection rate 2·96 per cent.). Monomorphic trypanosomes were also seen.

LEWIS (p. 532) reports the finding of a single female *G. tachinoides*, for the first time, in the southern Sudan near the Ethiopian border.

Details of treatment of a culture of *G. palpalis* which has been maintained in Switzerland, are given by GEIGY (p. 122).

The mechanism by which tsetse flies obtain their blood meals has been investigated by GORDON and CREWE (p. 514). The proboscis is capable of distal flexure ; " pool-feeding " from capillary haemorrhage is probably the usual method. People can become sensitized to the flies, and the reaction is different when they do. Swelling and weal-formation then take place, as a response to the injection of saliva.

Experiments indicate that it is unlikely that *Triatoma* or *Ornithodorus* can play any major rôle in transmission of African sleeping sickness (PACKCHANIAN, p. 18).

Clinical Findings : Treatment : Drug Prophylaxis

WILLCOCKS (p. 914) has devised a method for determining the proteins of the cerebrospinal fluid, in relation to sleeping sickness.

The glucose content of blood and cerebrospinal fluid of poorly nourished persons is apparently not influenced by sleeping sickness (GASQ, p. 914).

LAPEYSSONNIE (p. 533) describes two cases of long-standing sleeping sickness from West Africa, in which the trypanosomes were remarkably resistant to repeated courses of different arsenicals, and in which the disease was mild. He discusses the subject of drug resistance.

DEWEY and WORMALL (p. 337) discuss the determination of Suramin in whole blood and serum, and the effect of addition of antiseptics.

A method for the estimation of Suramin in plasma is described by GAGE *et al.* (p. 338).

The action of Suramin on various enzymes has been studied by TOWN *et al.* (p. 914), in an attempt to elucidate its mode of action. The inhibition of specific enzymes may account for the chemotherapeutic action of Suramin. The same authors (p. 1127) found that Antrycide had no inhibitory action on the same enzymes ; its mode of action is therefore probably different.

OESTERLIN (p. 1016) discusses the possibility that arsenic resistance in trypanosomes might be diminished by exposing resistant strains to a tantalate solution, and cites his own experiments which, though incompletely recorded, indicate that some effect of this kind was produced.

A new category of interference effect against the anti-trypanosomal activity of arsenicals and acridines is described by SCHLEYER and SCHNITZER (p. 915). The interference is exhibited by simple esters and amides of substituted benzoic acids and by corresponding nicotinic acid derivatives.

An account of the use of Melarsen and Melarsen oxide is given by NODENOT (p. 238), who used them in French West Africa on a few cases. He concludes that they are of moderate value.

In three papers FRIEDHEIM (p. 711) reports results of the use of Melarsen oxide, " Mel B " and " TPB " in *T. gambiense* infections in French West Africa. He gives the composition of Melarsen oxide, but not of the other two. He claims that Melarsen oxide is as good as tryparsamide in late cases, and the course of injections is shorter. Mel B has an action even in late cases with involvement of the central nervous system, and recommendations are given for courses of treatment for all stages. TPB is a detoxified form of reduced tryparsamide ; there were no toxic effects in a few patients treated with it, and trypanosomes disappeared from blood, glands and cerebrospinal fluid.

LE ROUZIC and LAPEYSSONNIE (p. 919) give a summary of French West African experience with Friedheim's melaminyl compounds, the diamidines, and Eagle's " 70A." Details should be sought in the original abstract ; they cannot well be further condensed.

The new compound known as Antrycide, various salts of which are used, is very active against several of the trypanosomes of man or animals ; its composition, and its effects in animals, are briefly reported by CURD and DAVEY (p. 338).

WILSON (p. 919) quotes experiences with Antrycide in Uganda which indicates that various trypanosomes of animals, including *T. congolense*, may become resistant to the drug in a comparatively short space of time. Its prophylactic action in a small group of cattle was not enough to protect them for 6 months in an area where *Glossina pallidipes* was present.

SCHOENBACH and GREENSPAN (p. 916) review the aromatic diamidines in relation to protozoal diseases and other conditions. In comment, LOURIE points out that in African trypanosomiasis they have been used only in *T. gambiense* infection.

FULTON and GOODWIN (p. 916) have investigated further the changes which take place in stilbamidine on exposure to light in a warm atmosphere ; details should be sought in the original.

BEAUDIMENT *et al.* (p. 918) have given lomidine by the mouth in treatment of *T. gambiense* infections. In the doses used, which sometimes produced diarrhoea and vomiting, the results were not as good as those achieved by injection.

Shortly after an injection of lomidine the blood sugar is raised, then it falls, and gradually increases to the original level (GASQ, p. 918).

The Foréami report for 1946 and 1947 (p. 913) shows that control of sleeping sickness was largely attempted by mass treatment and chemoprophylaxis. The situation continues to improve. Prophylaxis is carried out by injections of pentamidine or propamidine.

A trial of pentamidine as a prophylactic in French West Africa was apparently successful in protecting 1002 persons for 6 months, whereas there were 19 cases among 902 controls (BRUN-BUISSON *et al.*, p. 123). Results on re-examination 12 months after injection show incidence rates of 0·29 per cent. in the injected persons, and of 3·1 per cent. in the controls. The authors therefore propose to extend widely this form of prophylaxis (LE ROUZIC, p. 1015).

An experiment in drug prophylaxis with propamidine, carried out in the Belgian Congo, is reported by FAIN and MULDER (p. 239), who show that two intramuscular injections of 300 mgm. for men (rather less for women and children) at an interval of 6 months, served to protect against blood or gland infection for a period of 2 years, though examination of the cerebrospinal fluid indicated a high incidence of cryptic infection. Controls showed many more infections. Even a single dose has considerable protective value, but the whole question of cryptic infection in these circumstances needs investigation.

Control

One of the most important schemes of control of trypanosomiasis has been carried out in recent years at Anchau, Nigeria, where a fly-free area of some 700 square miles has been created and maintained, and where the people have been taught how to farm the land thus freed for them. NASH (p. 229) gives a detailed account of the development of this scheme, and of the difficulties encountered in the process. His original report, published for the British Colonial Office by H.M. Stationery Office, is well illustrated by photographs and diagrams; it should be studied by all who deal with African settlements.

LE ROUZIC (p. 922) writes of agricultural development in areas of French West Africa in which anti-tsetse clearing has been done. He comments on the importance of sacred groves as breeding places for *Glossina*, which are therefore in close contact with man.

VILAIN (p. 19) has used selective clearing to exterminate *G. palpalis* along rivers in French West Africa; the cost is about £5 to £6 for each kilometre.

MORRIS and MORRIS (p. 618) have experimented with traps for tsetse flies in West Africa. Even in the small "sacred groves" it was impossible by traps alone to eradicate tsetse, but traps may have a value, nevertheless, especially in the dry season when contact between man and fly is closest, round the few water-holes which remain.

Reports from the Game and Tsetse Control Department, Northern Rhodesia (p. 531) show that human sleeping sickness tended to persist in certain places, and has been dealt with by discriminative clearing and destruction of game. Much of the land has been resettled, and in some districts cattle can now be kept.

DDT has been sprayed once or twice a week on cattle in East Africa, as a means of controlling tsetse. WHITESIDE (p. 922) reports a slow reduction in flies caught, but notes that flies also feed on animals other than cattle. Regular treatment of the cattle for 2 months did not harm them.

FORD, WHITESIDE and CULWICK (p. 122) discuss the problem of African trypanosomiasis in a paper which should be read in full; their chief interest is in a broad approach which seeks to modify the whole environment so that it becomes unfavourable to the continuance of trypanosomiasis. Their scope is therefore very wide.

Trypanosomes of Animals

HEWITT *et al.* (p. 1128) investigated the action of *p*-phenylene diguanide on *T. equiperdum*; it has some curative effect.

In the *Mem. Acad. Sci. Ist. Bologna* (p. 1015) there is an account of an illness diagnosed by MESNIL in 1912 as infection with *T. evansi*, in a scientist handling that organism in the laboratory.

SCHOENAERS (pp. 240, 241) has investigated the effect of ultrasonic waves on red blood cells and trypanosomes of various species.

NYDEN (p. 241) records changes in the ascorbic acid metabolism of the rat infected with *T. hippicum*.

CHAGAS'S DISEASE

Epidemiology

Triatomid bugs, and some mammals, have been found infected with *T. cruzi* in the United States, but FAUST (p. 923), who gives a list of these, has not found any record of human infection.

Chagas's disease is present in Ecuador, though not common. LEÓN (p. 1017) shows that the common vector is *Triatoma dimidiata*, though others are also found, and that the chief reservoir hosts are opossums (*Didelphys*).

By xenodiagnostic methods TALICE (p. 241) has studied the incidence of *T. cruzi* infection in several areas of Uruguay, and reports rates of 5 to 8·6 per cent.

The infection rates with *T. cruzi* in various parts of Argentina, are given by ROMAÑA (p. 534).

In parts of Chile investigated by NEGHME and ROMÁN (p. 449), xenodiagnosis and serum tests revealed infection in 12 per cent. of 12,581 persons examined. Dogs and cats were positive to the extent of 13·4 per cent., and a few infected wild rodents were found. The infection rate in 20,614 triatomid bugs was 44 per cent. Insecticides are of some value against these bugs, but not much.

NEGHME *et al.* (p. 1128) report a fairly high incidence of Chagas's disease in Chile, where *T. infestans* is the vector. Some success was obtained in control by the use of DDT and benzene hexachloride.

Aetiology

GANAPATI (p. 339) has successfully cultivated *T. cruzi* in the developing chick embryo.

CONEJOS (p. 534) has also cultivated *T. cruzi* in developing hen eggs inoculated after 5–10 days of incubation.

SAMPATH and LITTLE (p. 714) describe a fluid medium for the cultivation of *T. cruzi*.

Penicillin and streptomycin can be used successfully to kill contaminants in cultures of *T. cruzi* and *Leishmania donovani*; they do not affect these organisms, even in quite high concentrations (SENECA *et al.*, p. 534).

PIFANO (p. 923) reports that natural infections with *T. rangeli* have been found in man and in dogs.

BORZONE *et al.* (p. 1132) report the finding of *T. rangeli* in the blood of a child in Santa Fé, Argentina. He was able to transmit the infection to pullets.

Transmission

WOOD (p. 619) gives a list of reduviid bugs found naturally infected with *T. cruzi* in Arizona, and of small mammals proved by xenodiagnosis to be carrying the trypanosomes.

Three species of triatomids (*T. infestans*, *T. sordida* and *P. megistus*) are infected with *Trypanosoma cruzi* in Minas Gerais; PELLEGRINO (p. 124) indicates the distribution and indexes of infectivity of these bugs.

The development cycle of *Triatoma sordida*, from egg to egg, occupies 5 months (PINTO, p. 1017).

The danger that Chagas's disease may be spread by blood transfusion is mentioned by PELLEGRINO (pp. 813, 1129), who suggests that the complement-fixation reaction for *T. cruzi* should be performed on all blood donors in the endemic areas.

Clinical Findings: Treatment

OSIMANI (p. 20) has used a complement-fixation test in Chagas's disease, for which he prepared antigens from the spleen of an infected dog. The results were positive in most cases in the early stages, but only about half of those in the chronic stage.

For Chagas's disease DE FREITAS and DE ALMEIDA (p. 1129) have devised a complement-fixation test with a new antigen (which they describe). Details are given in the original abstract, which can hardly be further condensed.

MUNIZ (p. 125) reports that the precipitin reaction has proved most valuable in the diagnosis of early Chagas's disease, but it is not useful in chronic cases. He describes the preparation of the precipitinogen from cultures of *T. cruzi*.

A modification of the xenodiagnostic test of Brumpt is described by CORNEJO (p. 1017) who sends collected blood to the laboratory, and feeds the bugs on it, rather than on the patient.

An electrocardiographic study of patients with Chagas's disease is reported by PIZZI *et al.* (p. 340). Myocardial affections were neither common nor severe.

PELLEGRINO and BORROTCHIN (p. 620) give an account of the findings, including electrocardiographic signs, in a series of patients in a hospital in Brazil, and a study of patients found during examination of railway workers (especially electrocardiographic investigation) is reported from the same area by DIAS *et al.* (p. 620).

An analysis of a large number of electrocardiographic records in Chagas's disease is contributed by DE BARROS (p. 1130).

Some action against *T. cruzi* infections in mice is shown by pentaquine and other antimalarial drugs of the same group, but GOBLE (p. 1131) thinks that they are probably too toxic to be useful in human infections.

Control

Gamma benzene hexachloride is more effective than DDT against the vectors of Chagas's disease; DIAS and PELLEGRINO (p. 20) used a preparation which forms an emulsion in water, and sprayed at the rate of 1–2 gm. of gamma BHC per square metre. Adult bugs were more susceptible than nymphs, but on mud walls the toxicity wore off considerably within a month. A combination of BHC and pyrethrum was very effective.

ROMAÑA and ABALOS (p. 535) show that benzene hexachloride, used either as a smoke or as a suspension in water, is effective against triatomidae in houses in Argentina.

Experimental work indicates that the insecticide thiophosphate o′ diethyl o″ paranitrophenyl may be useful against *Triatoma infestans* in houses (PELLOUX and DECOURT, pp. 814, 1131). It is of low toxicity to man in the dose advised for houses.

Charles Wilcocks

MALARIA

BOYD, Mark F. **Malariology. A Comprehensive Survey of All Aspects of this Group of Diseases from a Global Standpoint.**

This book is reviewed on pp. 502–8.

PARROT, L. & CATANEI, A. La contamination palustre du nourrisson en milieu hyperendémique algérien. [**Malaria Infection of Infants in a Hyperendemic Region of Algeria.**] *Arch. Inst. Pasteur d'Algérie.* 1949, Sept., v. 27, No. 3, 250–56.

The Réghaïa is a coastal region near Algiers where malaria is hyperendemic. It is here that, from 1940 to 1945, the authors and their colleagues carried out observations on the suppressive value of various drugs, quinine, mepacrine and premaline S [this *Bulletin*, 1947, v. 44, 700 ; 1945, v. 42, 445]. The drug was administered to the population each year throughout the transmission season, from 1st May to 30th November. Blood smears were examined twice a month from April to November and once a month from December to March. In this paper the results of these blood examinations, in so far as they concern infants in the first years of life, are recorded. Reference is made to the difficulties always encountered in attempts to administer prophylactic drugs to infants.

Between 1st April 1940 to 31st December 1945, 62 live births were recorded. Of these 56 infants lived through at least one epidemic season in the Réghaïa ; nine of these left the district soon after. Of the remaining 47, 38 were found infected during or immediately after their first transmission season, 6 during the second season, and 3 in the third, and this in spite of prophylactic medication.

Of the 47 infected infants, 28 were infected in the first year of life. Of the 44 infected before reaching the age of two, 26 had single species infections, 18 double infections. Of these 62 infections, 26 were with *P. falciparum*, 32 *P. vivax* and 4 *P. malariae*. Five infants died during this period of observation, but only one death was due to malaria. *Norman White*

PEREDA REGUERA, A. Datos estadisticos del paludismo en el territorio de Yebala. Cabilas de Beni-Hassan y Beni-Lait. [**Statistical Data of Malaria in the Beni-Hassan and Beni-Lait Districts of the Yebala Territory.**] *Med. Colonial.* Madrid. 1949, Nov. 1, v. 14, No. 5, 516–22, 3 graphs.

The Beni-Hassan District, Morocco, covers an area of 36,600 hectares, excluding forest land, and has a population of 13,497. The Beni-Lait District covers 7,700 hectares and has a population of 1,940. Of the 27 villages in the two districts, only 17 reported cases of malaria during the decade 1939–48. The incidence is not high. In the most malarious village the average annual malaria morbidity rate was 3·7 per cent. ; in the least affected villages only 0·1 per cent. The incidence among males was twice as high as the female rate. *P. vivax* infections were 80·8 per cent. of the total ; *P. falciparum* 17·9 per cent. ; *P. malariae* 1·2 per cent. July to October inclusive are the months of highest malaria incidence: these are the hottest months of the year. July and August are the months of minimal rainfall. *Norman White*

YOUNG, M. D. & JOHNSON, T. H., Jr. **A Malaria Survey of Liberia.** *J. National Malaria Soc.* 1949, Dec., v. 8, No. 4, 247–66, 5 figs.

In a survey which covered about 18 centres widely distributed through Liberia, 10,128 thick and thin blood smears were taken from people of various ages, and 3,104 (30·65 per cent.) showed malaria parasites. *Plasmodium*

falciparum was the commonest (83·8 per cent.), *P. malariae* constituted 14·2 per cent., *P. vivax* 2·0 per cent., and one infection diagnosed as *P. ovale* was seen apparently complicating a *falciparum* infection. Of 2,421 *P. falciparum* infections, gametocytes were found in 12·06 per cent., especially in the youngest children. The parasite rate at all ages varied from 21·17 per cent. in the coastal areas to 48·87 per cent. in the north. The age incidence of infections was :—

Under 1	43·88 per cent.
1–4	64·65 ,, ,,
5–9	49·54 ,, ,,
10–14	34·69 ,, ,,
15–19	22·49 ,, ,,
Over 19	20·77 ,, ,,

Boys over five showed significantly higher infection rates than girls. The parasite densities were estimated and are tabulated by ages and species of parasite, the general picture being a rapid decline from heavy infections in youngest infancy to mild ones in early childhood. The general picture is that of hyperendemic malaria as commonly seen, on which much interesting data are supplied.

The anophelines recorded were *A. gambiae*, *A. melas*, *A. funestus*, *A. hancocki*, *A. nili* and *A. smithii*. The *gambiae-melas* group constituted 94 per cent. of the adult mosquitoes collected and 6·45 per cent. of 543 dissected showed oöcysts or sporozoites or both, but no further details are given.

G. Macdonald

RAO, B. A. **A Short Account of the Malaria Problem in Mysore State.** *Indian J. Malariology.* 1948, Dec., v. 2, No. 4, 285–305, 3 maps & 1 graph.

The State of Mysore consists of two natural divisions—Malnad the hilly western portion comprising four districts with a combined population of 2,552,814, and Maidan, gently undulating country comprising five districts with a population of 5,097,186. Malaria endemicity is very much higher in Malnad than in Maidan. It has been estimated that malaria is responsible, directly or indirectly for 36 per cent. of the total mortality of Mysore.

Twenty-three species of *Anopheles* have been reported from Mysore, of which three, *A. fluviatilis*, *A. culicifacies* and *A. stephensi*, have been incriminated as vectors of malaria. In the two towns Mysore and Bangalore *A. stephensi* is the vector with the other two species playing a subsidiary rôle in the periphery. In the foothills of Malnad, rural malaria is transmitted solely by *A. fluviatilis*, the transmission season varying from three to eight months. The fertile Malnad is gradually being depopulated by malaria and hookworm disease. Malaria associated with irrigation in Maidan is transmitted by *A. culicifacies* and *A. fluviatilis* and transmission takes place throughout the year. Epidemic malaria occurs from time to time in areas of low endemicity.

The author describes the measures that have been taken to reduce malaria incidence in irrigation areas which have had encouraging results. DDT house-spraying was carried out in 264 villages in different parts of the Malnad in 1946–47. This was followed by a noteworthy reduction of malaria.

Norman White

DOWNS, W. G. & BORDAS, E. **A Malaria Survey of the Southern Territory of Lower California.** *Amer. J. Trop. Med.* 1949, Sept., v. 29, No. 5, 695–9.

The relatively little known Southern Territory of the California Peninsula extends south from the 28th parallel to 22°8′ N. It is mountainous with a few

narrow coastal plains, the largest of which are the Vizcaino Desert in the north and the Magdalena Plain, west and northwest of La Paz. There are passable roads from La Paz to the towns in the south, Triunfo, Santiago, Miraflores, and San José del Cabo, and to Todos Santos to the southwest. Communications between La Paz and the towns in the north, Loreto, Mulegé and Santa Rosalia, are mostly by boat. The climate is hot and dry and most of the region is desert or semi-desert. The towns mark the location of springs ; they are indeed small oases. There is an annual average of 11 days with rain ; most rain falls in September.

The present population, 51,471, is almost entirely of Spanish descent. The people are progressive. The only hospital is at La Paz. Another is under construction at San José del Cabo. Apart from the copper mine at Santa Rosalia, agriculture and fishing are the main pursuits. The land is very productive where there is enough water for irrigation.

Malaria was introduced apparently in 1904. Malaria morbidity and mortality for the years 1943-47, averaged 1,205 and 33 per 100,000 per annum. These rates are based on clinical diagnoses. The malarious towns of the region are reported to be Mulegé, San José del Cabo, Santiago and Todos Santos. These towns were visited in July 1948. Eight hundred and five school children were examined : enlarged spleen was found in 19·3 per cent., malaria parasites in 7·8 per cent. All the infections were *P. vivax*.

Anopheles pseudopunctipennis var. *typicus* is the only anopheline found in the southern territory of Lower California. *Culex quinquefasciatus* [*C. fatigans*] and *Aëdes aegypti* also occur. The breeding of *A. pseudopunctipennis* is dependent upon springs : heaviest breeding was always found in the presence of algal mats (*Spirogyra* and *Hydrodictyon*).

Malaria control by DDT residual spraying is recommended. Eradication of anophelines would be a possibility in the localities visited. *Norman White*

CODA, D. & RAMOS, A. da S. A malária na cidade de Santos. [**Malaria in the City of Santos, Brazil.**] *Arquivos de Hig. e Saúde Pública.* São Paulo. 1947, v. 12, Nos. 31–32–33–34, 65–104. [44 refs.] English summary.

This paper opens with a short interesting historical account of the foundation, growth and development of the City of Santos. Its geology and climate are briefly described. Early reports on the incidence of fevers and the deaths ascribed to malaria are summarized. The authors' own observations date from 1940.

Malaria transmission takes place in most parts of the city and the suburban areas but the endemicity is of low grade. During the seven years 1940–1946 malaria parasites were found in 1,976 blood slides from patients treated in Santos. These cases were not necessarily all local infections. The species incidence was *Plasmodium vivax* 86·5, *P. falciparum* 12·4 and mixed infections 1·1 per cent. One *P. malariae* infection was consequent upon a blood transfusion.

Reference is made to the cyclic exacerbations that characterize the malaria endemicity of the State of São Paulo and their repercussion on Santos.

Twelve species of *Anopheles* were found in Santos, in both adult and larval form: *A. tarsimaculatus*, *A. oswaldoi*, *A. noroestensis*, *A. albitarsis*, *A. argyritarsis*, *A. strodei*, *A. intermedius*, *A. maculipes*, *A. mediopunctatus*, *A. eiseni*, *A. cruzii*, *A. bellator*. *A. tarsimaculatus* is responsible for the transmission of the local malaria. *Norman White*

EICHLER, W. & PAGAST, F. Larvenentwicklung von *Anopheles messeae* in Laboratorium und Freiland. [**Larval Development of *Anopheles messeae* in the Laboratory and in Nature.**] *Ztschr. f. Parasitenk.* 1949, Jan. 14, v. 14, Nos. 1/2, 60–69.

The authors wish to know the duration of each of the four larval stages of *A. messeae*: this is important in planning larval destruction by dusting.

The authors have a large collection of fact, based on work in a laboratory at about 25·5°C., and show that there is a good concordance between their figures and those which could be obtained by the use of a general formula. They have also assembled facts published by others, about the length of larval life at sundry temperatures. In nature, development at a particular temperature is generally quicker than in the laboratory, which suggests that the laboratory method though giving consistent results, is deficient, perhaps in nutrition.

[The authors do not give a final table, showing what they regard as the normal or minimal developmental periods at various temperatures.]

P. A. Buxton

JADIN, J. & FAIN, A. *Anopheles funestus* Giles transmetteur de paludisme en pays d'altitude (Astrida 1750 m., Ruanda-Urundi). [*Anopheles funestus* **as a Vector of Malaria in Hilly Country.**] *Ann. Soc. Belge de Méd. Trop.* 1949, June 30, v. 29, No. 2, 145–9, 1 pl.

Twice a week from August 1948 to January 1949 the authors searched for anopheline mosquitoes in African huts in hilly country in Ruanda-Urundi. The huts were situated at altitudes between 1,750 and 1,800 metres [5,700 and 5,900 feet]. In all, 1,184 *Anopheles funestus* were found, as well as a very small number of other species. Of 207 female *A. funestus* which were dissected, 23 were found infected with *Plasmodium*; there were seven with sporozoites only, 14 with oöcysts only and two with both glands and stomach infected.

H. S. Leeson

SUBRAMANIAN, R. & DIXIT, D. T. **Observations on the Vectors of Malaria in Khandwa Tahsil, Nimar District, Central Provinces, and Notes on the Seasonal Infectivity of Anopheles.** *Indian J. Malariology.* 1948, Dec., v. 2, No. 4, 313–22, 1 map & 1 graph.

The Khandwa Tahsil in the Central Provinces of India lies between the Nebuddah River to the north and the main range of the Western Satpuras to the south. The authors report on the examination of 8,943 *Anopheles* captured in three parts of the tahsil, one in the Satpura range, 850 feet above the plain and 2,283 feet above sea-level; the second where the range merges with the undulating plain of the tahsil; the third in the plain.

Nine species of *Anopheles* figured in the total catch, by far the most numerous being *A. culicifacies* (7,337) and *A. fluviatilis* (1,324). These were the only species found naturally infected, 16 *A. culicifacies* (0·21 per cent.) and 17 *A. fluviatilis* (1·28 per cent). No infected specimen was captured in either July or August. Transmission appears to extend from September to January inclusive. In the hyperendemic villages in the hills and at their foot, both species were found infected. In the plain, where there is very little malaria, infection was found only in *A. culicifacies*. *A. theobaldi* was also associated with hyperendemic malaria in jungle villages.

Norman White

LAIRD, M. **Observations on** *Anopheles punctulatus* **Dönitz, 1901,** and *Anopheles farauti* **Laveran, 1902, at Palmalmal and Manginuna, New Britain, during July and August, 1945.** *Trans. & Proc. Roy. Soc. New Zealand.* 1946, Sept., v. 76, Pt. 2, 148–57, 2 graphs. [11 refs.]

As a result of a mosquito survey at Jacquinot Bay, New Britain, the breeding places of *Anopheles farauti* were observed to consist mainly of long-established natural ground pools, shaded by emergent and overhanging grasses and containing algae and insect predators. On the other hand, larvae of *A. punctulatus* were usually found in man-made temporary rain-pools in ditches and ruts formed as a result of military activity ; these were devoid of macroflora and macrofauna and were exposed to the maximum sunshine.

Both mosquitoes are known to be vectors of malaria so a pool of each type was selected for study and daily records were kept of larval counts, rainfall and temperature. Rain temporarily enlarged the permanent pools, but the numbers of *A. farauti* larvae remained at a reasonably constant level ; the numbers of *A. punctulatus* larvae fluctuated so much that at times of little or no rain the figures were very much higher than those for *A. farauti* and during rain the larvae were often flushed out and destroyed. Predacious insects in the permanent pools exercised some control over *A. farauti* and though the temporary pool lacked such predators, the larvae of *A. punctulatus* displayed cannibalistic tendencies when the breeding place became overcrowded.

A. farauti, owing to its preference for permanent breeding places, was previously the dominant anopheline in this area and in normal circumstances was of greater significance than *A. punctulatus* as a vector, but the position would be reversed if conditions are allowed to remain which are favourable to the temporary dominance of *A. punctulatus* ; however, anti-malaria discipline and mosquito control were enforced from the outset and there has been no serious outbreak. *H. S. Leeson*

See also p. 497, PERRY, **The Mosquitoes and Mosquito-borne Diseases of the Treasury Islands (British Solomon Islands).**

CHOW, C. Y. **The Anopheline Mosquitoes of Taiwan (Formosa), China.** Reprinted from *Quart. J. Taiwan Museum.* 1949, v. 2, No. 1, 9 pp. [25 refs.]

" 1. Sixteen species of anopheline mosquitoes are found in Taiwan. *A. kochi* having been reported on the basis of a single specimen only should be deleted from the list ; while *A. fluviatilis* should now be added.

" 2. An identification key for both adults and larvae is presented.

" 3. The general distribution of species is summarized.

" 4. Some notes are given on the morphological variations and the breeding places of each species."

CASANGES, A. H., MCGOVRAN, E. R. & CHILES, J. V. **Rearing of** *Anopheles quadrimaculatus* **Say and** *Aedes aegypti* **(L.) in the Laboratory.** *Mosquito News.* 1949, Sept., v. 9, No. 3, 112–17, 5 figs.

ZUKEL, J. W. **Observations on Ovarian Development and Fat Accumulation in** *Anopheles quadrimaculatus* **and** *Anopheles punctipennis.* *J. National Malaria Soc.* 1949, Sept., v. 8, No. 3, 234–7. [12 refs.]

The following is the author's summary :—

" 1. In dissections of wild adult females of *Anopheles quadrimaculatus* and *A. punctipennis* collected in South Georgia in the winter, a wide variation was

found in the amount of stored fat ; a similar condition was found among specimens of the former species collected in autumn.

"2. A majority of both species passed the winter with the ovaries only slightly developed (Christophers' Stage II). Both species produced eggs after ingestion of a blood meal.

"3. The frequent discovery of unassimilated blood in the gut of specimens of *A. quadrimaculatus* and *A. punctipennis* collected throughout the winter attests to their activity in this season".

GOODWIN, M. H., Jr. **Observations on Dispersal of** *Anopheles quadrimaculatus* **Say from a Breeding Area.** *J. National Malaria Soc.* 1949, Sept., v. 8, No. 3, 192–7.

Three release-and-recapture experiments were made with *Anopheles quadrimaculatus* ; a total of 5,151 were collected near a breeding place, stained and released immediately. Subsequently, at varying intervals, over more than seventy days, 29,694 mosquitoes were collected around the breeding place at points where the mosquitoes were originally obtained. Among these, 301 were found to be stained, making 1·01 per cent. of the total recovered and 5·8 per cent. of the number originally released. [When compared with the tables, the total of 18,476 specimens and the percentage 1·6 given in the author's summary are in error.]

It was noted that a high proportion of females remained around the breeding place for a day or two after staining, probably to mate and oviposit. Altogether more males were taken than females ; but no stained females were seen after the fifteenth day though one marked male was taken on the seventeenth and another on the eighteenth day after staining. *H. S. Leeson*

ŻUKEL, J. W. **A Winter Study of** *Anopheles* **Mosquitoes in Southwestern Georgia, with Notes on some Culicine Species.** *J. National Malaria Soc.* 1949, Sept., v. 8, No. 3, 224–33. [15 refs.]

In a malarious area of south-western Georgia, U.S.A. a study was made of the winter behaviour of *Anopheles quadrimaculatus* and other mosquitoes.

Larvae of *A. quadrimaculatus* were not found in January or February but larvae of *A. crucians* and *A. punctipennis* were collected throughout the winter. Adult mosquitoes were collected from artificial resting places and from 162 hollow trees. The hollows were fumigated with sulphur dioxide gas generated by burning a mixture of sulphur and fuel oil in an improvised burner. This method proved to be superior to hydrogen cyanide and pyrethrum aerosol. The mosquitoes collected from the hollow trees included females of *Anopheles quadrimaculatus*, *Anopheles punctipennis*, *Culex erraticus*, *Culex peccator* and *Culex quinquefasciatus* [*fatigans*]. *H. S. Leeson*

BERTRAND-FONTAINE, FAUVERT, R., SCHNEIDER, J. & HARTMANN, L. L'atteinte hépatique au cours du paludisme. [**Hepatic Involvement in Malaria.**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1949, No. 25, 1098–109, 7 charts. [20 refs.]

The observations recorded were made on 49 patients suffering from acute malaria and on eleven cases of inoculated malaria. The inquiry began with the systematic use of MacLagan's thymol reaction. In seven patients seen during the acute attack the thymol reaction, read with Meunier's electrophotometer was always above 40, in some cases as high as 214. All seven patients after appropriate treatment had thymol reactions below 25. In five other similar patients, but who were not re-examined after treatment, the reaction was

always above 50 and sometimes reached 345. In five patients who had had attacks of malaria less than a month previously the readings were between 35 and 52·5. In 22 patients whose last attacks of malaria occurred at least three months previously the readings were all below 30.

In other cases, and in the eleven patients undergoing malaria therapy, other liver functional tests were carried out in addition to the thymol reaction. After the fifth or sixth paroxysm there was always: a progressive rise in the thymol reaction readings; a parallel fall in cholesterol; Hanger's cephalin-cholesterol reaction strongly positive; and a fall in serum albumin, varying in amount, but the globulin content had a tendency to rise. After treatment normal readings were usually noted in three to five weeks: Hanger's reaction was the last to become normal. These results are obtained no matter whether trophozoites or sporozoites are used in transmitting infection. The functional changes in the liver that these reactions denote are caused by the malaria parasite and not by the fever: a similar number of comparable febrile attacks resulting from the intravenous injection of TAB cause no such changes.

Hepatic involvement in acute malaria is constant and rapidly reversible.

Norman White

TORRES, A. L. Resistência e imunidade antimalárica. Relação com os doadores de sangue. [**Resistance and Immunity to Malaria.**] *Hospital.* Rio de Janeiro. 1949, Oct., v. 36, No. 4, 597–603. English summary.

The author defines "resistance" as a certain degree of defence against microbial invasion and "immunity" as a high grade of resistance. Remarks follow on primary or racial immunity as in negroes to malaria infection, and acquired immunity as in those dwelling in zones of high endemicity who may harbour the parasite but give no clinical evidence of so doing; in time anti-parasitic immunity is also set up and the plasmodia are no longer found in the blood.

These points are stressed with a view to inculcating caution in the selection of blood-donors; at best, refusing all who have any history of previous malaria. If, as in Rio de Janeiro, others have to be used, their blood should be reserved for the preparation of dried plasma, or, if it is necessary to use the whole blood, this should only be done after it has been kept in the ice-chest at 6°C. for 12 days, "for it is admitted that [malaria] parasites lose their vitality under such conditions." [But see this *Bulletin*, 1949, v. 46, 799; 1002.]

H. Harold Scott

STOLL, B. **Percussion of the Spleen.** *Amer. J. Trop. Med.* 1949, Sept., v. 29, No. 5, 691–4. [11 refs.]

Malariologists, for the most part, rely on palpation alone to determine the presence of splenic enlargement and its extent. This paper, based on the study of more than a thousand patients infected with malaria in an Army Station Hospital in New Guinea, is a useful reminder that percussion may afford valuable information.

Abnormal left lower thorax dullness, not attributable to intra-thoracic disease, was almost constantly noted, even in cases in which the spleen was not palpable. In acute malaria this abnormal dullness preceded the development of a palpable spleen. The dorsal decubitus position of the patient was found to be most suitable. Respiration should be quiet and percussion of medium intensity. Percussing from above downward a distinct change from pulmonary resonance to dullness at the eighth rib or above, and extending to the costal margin, on the mid-axillary line, denotes splenic enlargement. *Norman White*

YOUNT, E. H., Jr. & COGGESHALL, L. T. **Status of Immunity following Cure of Recurrent Vivax Malaria.** *Amer. J. Trop. Med.* 1949, Sept., v. 29, No. 5, 701–5.

Twenty-one healthy male prison volunteers in Illinois, without previous malaria infections, were inoculated with Chesson (Southwest Pacific) strain *P. vivax* sporozoites. They were cured by the administration of pentaquine 60 mgm. and quinine 2·0 gm. daily for 14 days, some after the initial attack, others after having experienced several relapses. At varying intervals after cure they were reinoculated with sporozoites or trophozoites of both homologous and heterologous strains.

Ten volunteers after cure were reinfected with the Chesson strain by mosquito bite. Those of them who had had previously less than four febrile attacks experienced clinical symptoms, incubation period and the exuberant multiplication of parasites very similar to those observed during their initial primary attack and last relapse. The only change was an increase in the pyrogenic threshold of parasites necessary to produce a fever of 103°F. (rectal temperature) from an average of 275/cmm. for the primary attack, to 400/cmm. for the last attack before cure and to 500/cmm. for the attack following reinoculation. The three volunteers who had experienced four or more malaria attacks before cure displayed considerable immunity when reinoculated, developing only a parasitic response. In two there was a spontaneous disappearance of parasites in eight and nine days, respectively, and in the third the parasitaemia had begun to decline when therapy was started on the 18th day. Thus there is a residual humoral immunity which is not immediately lost when parasites are eradicated.

In these cases there was no significant relation between host resistance and the interval between chemotherapeutic cure and reinfection.

Eight volunteers previously cured of their mosquito-induced malaria each received an intravenous injection of whole blood containing 500,000 trophozoites of the Chesson strain of *P. vivax*. Host resistance was noted in only one of the eight, and that only slight. In him the pyrogenic threshold of 103°F. rose from 25/cmm. in the initial primary attack to 475/cmm. for the last relapse and to 225/cmm. following reinfection. In the other seven patients the clinical course was comparable to that in the primary attack. They had had from one to five attacks of malaria following primary infection, and the interval between cure and reinfection was from three weeks to 19 months.

Observations on three other volunteers showed no evidence of cross immunity with a heterologous (St. Elizabeth) strain of *P. vivax*.

The results show that after the eradication of acute or chronic *vivax* malaria by chemotherapy there is temporary immunity to reinfection by the homologous organism, which bears a positive relation to the number of relapses but not to the duration of infection before cure. Resistance was greater to sporozoite than to trophozoite reinfection, probably owing to the greater number of parasites inoculated as trophozoites. But in human beings, as in experimental animals, lasting resistance to a malaria infection is dependent upon an existing infection, either active or subclinical. *Norman White*

FEDER, A. **Clinical Observations on Atypical Lichen Planus and Related Dermatoses presumably due to Atabrine Toxicity.** *Ann. Intern. Med.* 1949, Dec., v. 31, No. 6, 1078–89, 5 figs.

This condition, although mainly confined to New Guinea, also occurred in the neighbouring islands as well as in the China, Burma and India area and even in

Italy. In addition to atypical lichen planus two other apparently related conditions were met with, *viz.*, eczematoid dermatitis, usually with severe exudate, and a severe type of exfoliative dermatitis. Usually the disease occurred in those who had been in the endemic area from two to nine months, and those who had been there for a longer time did not appear to develop the condition. So far as is known this disease has not been described in Americans or Filipinos living in the area before the war. Males and females were affected with equal severity.

Atypical lichen planus was most common in those of the Caucasian race Africans being rarely affected.

The characteristic lesion was a well defined, flat-topped, hypertrophic papule the border of which was irregular and angular, some lesions having an almost slate-blue colour. The surface was striated and showed fine scales, and the papules at first were discrete but tended to coalesce. The earliest lesions seemed to occur on the exposed parts of the body, but the genitalia and perineum were frequently involved and in some cases the only demonstrable lesions were on the penis. About one-third of the patients showed oral lesions, usually as irregular non-ulcerated greyish-white patches on the buccal mucosa, less frequently on the palate and tongue. Stellate linear fissures in the perianal skin were a characteristic feature. The one constant feature in all cases was the taking of atebrin [mepacrine] in the usual suppressive dose of 0·1 gm. daily. In 10 patients a co-existing labial cheilosis was seen ; this always responded to riboflavin in oral doses of 5 mgm. daily. There was no evidence to show that atebrin might, in some cases, cause a cutaneous photo-sensitivity. The condition occurred as often in non-combatants as in those who were in action.

In uncomplicated non-exudative cases no regular changes were found in the leucocyte count, sedimentation rate, urine, blood protein, or albumin/globulin ratio, but eosinophilia was a frequent finding in patients with exfoliative dermatitis. No true aplastic anaemia or agranulocytopenia and no jaundice, hepatomegaly, or involvement of the nervous system were seen in the author's cases, while splenomegaly and lymphadenopathy did not occur in those in whom a definite secondary infection was absent. Many patients had a moderate normochromic or hypochromic anaemia. Uninfected cases were afebrile and it appeared that the death rate was low, death, when it occurred, being due to agranulocytosis, aplastic anaemia and cerebral haemorrhage.

All patients diagnosed as having atypical lichen planus were sent back to the United States, regardless of the extent of the disease, and this also held for those with exfoliative dermatitis. Patients with eczematoid dermatitis were returned to duty if, under treatment, the dermatitis disappeared and there were no lesions suggestive of atypical lichen planus, but the recurrence rate in this group was high and withdrawal of atebrin did not seem to have any effect if they were retained overseas.

Locally, when exudation was present, wet dressings of boric acid, very dilute solutions of potassium permanganate, normal saline, or penicillin in saline (500 units per cc.) were used. Penicillin was given parenterally in all cases which were seriously infected or in which fever was present. Good results were obtained from administration of plasma in severe exudative lesions ; in patients with any marked anaemia whole blood transfusions were administered. The diet was as rich in protein as possible and in exfoliative cases intramuscular liver extract was used. No ointments were used in the tropics as it became apparent early that their use aggravated the condition. For a sedative effect, chloral or paraldehyde was administered and for analgesia codeine was given. Arsenicals and bismuth, used by others, were found to have no effect. Radiation therapy was not employed.

The author considers that atypical lichen planus is merely the cutaneous manifestation of a general disorder and that prolonged administration of atebrin is the presumptive cause of the disease. [See also this *Bulletin*, 1947, v. 44, 763.] *C. F. Shelton*

McChesney, E. W. & McAuliff, J. P. **Metabolism of some 9-Aminoacridine Derivatives.** *Proc. Soc. Exper. Biol. & Med.* 1949, Nov., v. 72, No. 2, 378–82. [15 refs.]

The authors have investigated the absorption, excretion and tissue distribution of four compounds of the 9-aminoacridine series, including Acranil, which are structurally related to atebrin [mepacrine], and have been found active against various intestinal parasites. Rats of 250 to 365 gm. weight were used and the drugs were administered orally in doses of 50 to 500 mgm. per kgm. of body weight, dissolved or suspended in water. Food was withheld for 24 hours after medication and during this period faeces and urine were collected. At the end of the period, blood samples were obtained by cardiac puncture and the animals were sacrificed for analysis of tissues by the method of Brodie & Udenfriend [this *Bulletin*, 1947, v. 44, 793]. Variations in the rate of absorption, excretion, tissue distribution and blood levels were noted and none of the compounds appeared to be absorbed so fast as atebrin. Metabolic alteration of each substance appeared to occur in the liver, where the greatest concentration of drug was present. *J. D. Fulton*

Hammick, D. L. & Mason, S. F. **Some Physico-Chemical Properties of Acridine Antimalarials, with reference to their Biological Action. Part I. Basic Dissociation Constants and Reduction Potentials.** *J. Chem. Soc.* 1950, Jan., 345–8, 3 figs.

Hammick, D. L. & Mason, S. F. **Some Physico-Chemical Properties of Acridine Antimalarials, with reference to their Biological Action. Part II. Lipoid Partition Coefficients, Surface Activities, and Protein Affinities.** *J. Chem. Soc.* 1950, Jan., 348–50, 2 figs.

Mason, S.F. **Some Physico-Chemical Properties of Acridine Antimalarials, with reference to their Biological Action. Part III. The Correlation of Physico-Chemical Properties with Biological Action.** *J. Chem. Soc.* 1950, Jan., 351–4, 2 figs.

Edeson, J. F. B. & Field, J. W. **Proguanil-Resistant Falciparum Malaria in Malaya.** *Brit. Med. J.* 1950, Jan. 21, 147–51, 9 figs. [18 refs.]

When the use of proguanil started in Malaya the clinical response of naturally acquired *P. falciparum* infections to single dose therapy was good. During 1947 there was little to choose between a single proguanil dose of 100–300 mgm. and a course of 300 mgm. daily for five days ; the fever and parasitaemia cleared at about the same rate. In October 1948, however, a patient treated with a single dose of 250 mgm. failed to respond. There have been 20 failures since then, one out of every four cases treated in this way. But the efficiency of a standard-proguanil course of 300 mgm. daily for seven to ten days was not seriously questioned till April 1949 when this method failed in one case. Six

further failures occurred in May and six in June. Case reports of five of these patients are produced : daily parasitaemia records are given.

The rubber estates from which most of the patients came have used proguanil for suppression for many months, some for two years or more. The authors believe that this fact is related to the local emergence of resistant strains of *P. falciparum*. Such resistance has not yet become a serious embarrassment in Malaya as a whole : the drug is still being used with success by the medical services, the Army and the rubber companies. But will resistance increase ? Haphazard proguanil suppression is a potential menace. *Norman White*

COOPER, W. C., COATNEY, G. R., IMBODEN, C. A., Jr. & JEFFERY, G. M. **Aureomycin in Experimental Chesson Strain Vivax Malaria.** *Proc. Soc. Exper. Biol. & Med.* 1949, Dec., v. 72, No. 3, 587–8.

The authors made a limited trial of aureomycin against a sporozoite-induced Chesson strain of *P. vivax* malaria in volunteers, following the procedure adopted in their earlier work on antimalarials [this *Bulletin*, 1948, v. 45, 679].

The dosages of aureomycin given were high, and approached the range which they had found effective against *P. gallinaceum* in chicks [see below].

For preventive trials, two volunteers were each given 1 gm. of aureomycin every three hours on the day of being bitten by 10 heavily infected *Anopheles quadrimaculatus*. The same daily dose of 8 gm. was given for six days thereafter. Patent malaria did not appear for 30 and 31 days after exposure : in four controls, patent malaria appeared in 12 to 14 days. Similar periods were found in other controls. The delay is interpreted as indicating some antiplasmodial action, although complete prophylaxis was not attained.

In therapeutic trials, the four controls above were to be given 8 gm. daily for seven days in two cases and 4 gm. daily for 14 days in the other two : but the higher doses sometimes caused nausea and vomiting in these malarial patients, so that administration by vein was sometimes necessary.

A table shows that fever and parasite densities increased until about the sixth day, when the latter fell steeply. Quinine (2 gm. daily for seven days) was then given, after which all four patients had relapses within 10 to 14 days.

While there was thus a delayed action of aureomycin against erythrocytic parasites, it was far too slow to be of practical value and infections were not cured. *H. J. O'D. Burke-Gaffney*

SEABRA, P. Thérapie dirigée. Recherches de Pharmacodynamique. [**Directed Therapy : a Pharmacodynamic Investigation.**] *Rev. Paludisme et Méd. Trop.* 1949, May 15, v. 7, No. 60, 138–45. [25 refs.]

With an ultramicroscope the author observed a drop of blood in contact with a drop of colloidal quinine Where the two liquids met many of the quinine particles were adsorbed by the red cells. That observation was the starting point of the investigations described. This adsorption phenomenon is dependent upon the reaction of the blood : if this be acid the adsorption is intense ; if it is alkaline, adsorption is feeble or absent, the colloidal particles retaining their usual brownian movement. Not all colloids behave in this way : of the substances tried by the author only quinine and silver have acted thus. The adsorption of colloids by red-cells prevents the former from reaching their normal destination, the reticulo-endothelial system.

In future it may well be possible to obtain at will the fixation of a remedy in certain tissues cells or organs of the body by attention to the humoral preparation of that body. Such " directed therapy " opens up new possibilities in the treatment of malaria. *Norman White*

PEREDA REGUERA, A. Saneamiento por desecación de terrenos encharcados como mètodo de lucha antipalúdica. [**Drainage of Swampy Land as an Antimalarial Measure.**] *Med. Colonial.* Madrid. 1949, Nov. 1, v. 14, No. 5, 496–515, 27 figs.

This is a clear concise description of the principles and practice of subsoil drainage which should be of value to sanitary engineers. The methods described accord with accepted practice. Detailed instructions are clearly given.

Norman White

BUONOMINI, G. & MACCARRONE, A. Considerazioni sulla malaria dell'Isola d'Elba. Sulla possibilità di dradicare l'*A.* (*Maculipennia*) *labranchiae.* [**Malaria in the Island of Elba : Possibility of eradicating** *A. maculipennis labranchiae.*] *Riv. Italiana d'Igiene.* 1948, Sept.–Dec., v. 8, Nos. 9/12, 352–63, 2 graphs. English summary (5 lines).

In a previous paper a war-time outbreak of malaria in the Island of Elba was described, as were the measures taken to bring it under control [this *Bulletin*, 1949, v. 46, 315]. This paper continues the story. Antilarval measures superimposed on the DDT spraying of dwellings and animal houses have been successful. In the Commune of Portoferraio, primary infections and relapses of *P. vivax* malaria numbered : 1946, 201 and 323 ; 1947, 31 and 364 ; 1948, 0 and 22. The spleen rate of children under 12 years of age was 8 per cent. in 1946 ; 6 per cent. in 1947 ; 1·6 per cent. in 1948. The measures were to be carried on through 1949 and the prospect of the complete eradication of *A. maculipennis labranchiae* from the island appears to be assured. *Norman White*

MUIRHEAD-THOMSON, R. C. **DDT and Gammexane as Residual Insecticides against** *Anopheles gambiae* **in African Houses.** *Trans. Roy. Soc. Trop. Mèd. & Hyg.* 1950, Jan., v. 43, No. 4, 401–12, 2 pls.

In West Africa Muirhead THOMSON had shown [this *Bulletin*, 1948, v. 45, 405, 482] that large numbers of *Anopheles gambiae* could escape unharmed from African village houses treated with DDT in kerosene at the rate of up to 250 mgm. DDT per sq. ft. He continued investigations into this problem in Dar-es-Salaam, Tanganyika Territory, using rectangular huts of mud wall, palm thatch roof superimposed on bamboo framework ; measurements were 11×7×7 ft. The huts were practically light-proof except for the 1 ft. square window opening, to which detachable trap cages could be fixed. Africans slept in the huts every night. Immediately after spraying, the floor was covered by a single clean white sheet, which was removed and replaced daily. Untreated huts were used as controls.

The DDT experiment was carried out in a *gambiae-funestus* zone and the benzene hexachloride [BHC] experiment in a predominantly *gambiae* zone. The materials used were DDT water dispersible powder and Gammexane water dispersible powder P 530 [6 per cent. gamma isomer]. The dosages on the interior surfaces were double that recommended for general use, 400 mgm. DDT per sq. foot and 24 mgm. gamma isomer per sq. foot, respectively, or 1 lb. of powder to 1 gallon of water in each instance.

Regular inspection of huts, sheets and cages were made for five weeks after treatment with DDT and thirteen weeks after BHC. The results are fully tabulated and should be referred to in the author's paper but for convenience of comparison of results the abstracter has compiled the following table indicating the effect on *A. gambiae* :—

Mean Daily Catch

Treated Huts

Inside Hut		Weeks before and after Treatment															
		3	2	1	1	2	3	4	5	6	7	8	9	10	11	12	13
DDT	Alive ...	22·7	36·5	—	0	0	0	0	0	—	—	—	—	—	—	—	—
	Dead ...				0	·3	·2	2	·5	—	—	—	—	—	—	—	—
BHC	Alive ...	13	21	104	0	0	0	0	0	0	0	0	0	0	0	0	0
	Dead ...				26	21	10	12	16	9	8	8	10	9	8	3	5

Window Cage		Weeks before and after Treatment															
		3	2	1	1	2	3	4	5	6	7	8	9	10	11	12	13
DDT	Alive ...	·3	1	—	15	25	33	32	17	—	—	—	—	—	—	—	—
	Dead ...				0	0	0	0	0	—	—	—	—	—	—	—	—
BHC	Alive ...				0	0	0	0	0	0	0	0	0	0	0	0	·5
	Dead ...				·5	1	3	3	5	1	1	0	0	0	0	0	0

Untreated Huts

DDT	6	8	—	6	7	2	8	4	—	—	—	—	—	—	—	—
BHC	26	16	19	17	28	6	8	26	15	13	5	7	7	—	—	—

In the hut treated with DDT, 98 per cent. of *A. gambiae* were alive 24 hours, and 80 per cent. 48 hours, after leaving *via* the window trap. The number found dead in the hut was only about 1 per cent. of those that escaped alive after feeding. In contrast, similar huts treated with BHC proved completely lethal to all *A. gambiae* entering for 13 weeks after treatment.

The numbers of *A. funestus* in the DDT experimental huts were rather low to give conclusive results, but they suggested that the reactions of this mosquito may be rather different from those of *A. gambiae*. Further experimental work in a *funestus* infested area is necessary.

Under the conditions of this experiment and with the particular materials used it seems clear that BHC kills *A. gambiae* and DDT does not, when applied in the usual manner as residual insecticides. See also this *Bulletin*, 1944, v. 46, 439.] *R. Ford Tredre*

NAIR, C. P. **Activities of Indian Antimalaria Units in World War II.** *Indian Med. Gaz.* 1949, Aug., v. 84, No. 8, 363–7, 7 figs. on pl.

The author describes his experiences while in command of antimalaria units during the second world war. From 1943 to 1945, his unit was responsible for malaria control work in five military camps in and around Salsette Island near Bombay. Malaria endemicity is high in this area : children in nearby villages had spleen rates from 40 to 90 per cent. *Anopheles fluviatilis* was the vector. Specimens of *A. jeyporiensis* and of *A. jamesi* were also taken. The

measures taken were comprehensive in scope and apparently effective. The malaria sickness rate per 1,000 of strength per day fell from 5·0 in 1943 to 0·2 in 1945.

From September 1945 to June 1946, the unit was in the Klang District, Selangor, Malaya. Here DDT barrier spray, and later DDT residual spray, combined with the suppressive use of mepacrine gave very adequate protection to the inmates of the camp concerned. *Norman White*

RAMAKRISHNAN, S. P., KRISHNAN, K. S. & RAMAKRISHNA, V. **Report on a Pilot Scheme for Malaria Control in the Betelnut-Growing Areas in Puthur Taluk, South Kanara District, Madras Province, 1947–48.** *Indian J. Malariology.* 1948, Dec., v. 2, No. 4, 247–82, 1 graph & 1 map.

The Malaria Institute of India carried out a survey in May 1947 to determine an economical method of controlling malaria in a betel-nut growing area in the South Kanara District. The Puthur Taluk, which was selected for this purpose, is separated by the Western Ghats from the State of Mysore. Three rivers traverse the area from the Ghats to the Arabian Sea and most of the betel-nut cultivation is along the upper reaches of these rivers and their tributaries. In the foothills of the Western Ghats malaria is hyperendemic. Sixteen villages were selected for experiment, sheltering altogether a population of 13,500 scattered over an area of 250 square miles. These " villages " are for the most part clusters of huts surrounding the plantation's landlord's well-built house. Footpaths are often the only means of communications between these villages. Almost every year the number of deaths in this region exceeds the number of births : 37 to 57 per cent. of the total deaths are attributed to " fevers."

Anopheles fluviatilis is the sole malaria vector. This species favours outdoor resting places but often remains in houses for a few hours round midnight : they are rarely found in cowsheds. They breed in nullahs, along the edges of streams, in irrigation channels and in rice fields.

The annual rainfall is about 135 inches, most of which falls in June, July and August—the south-west monsoon. The heavy rainfall in these months scours mosquito breeding places with a consequent reduction in anopheline density. January to June is the period of maximum malaria transmission.

DDT spraying of houses was carried out in June-August 1947, in January-February 1948 and in April-May 1948. Details are given of the methods adopted and the cost of operations. The residual toxic activity of the DDT lasted for 3 months during the dry months, and for as long as 5 months during the humid months. The incidence of malaria appears to have been greatly reduced as a result of these operations but the data produced do not permit any exact evaluation of results. There is a recommendation that two sprayings a year are essential, in January and April. A third spraying in October may be found to be necessary. The work is to continue. *Norman White*

HAJRA, B. N. **A Preliminary Note on Antimosquito Operations in Cuttack Town.** *Indian J. Malariology.* 1948, Dec., v. 2, No. 4, 307–11.

Cuttack became the capital of the newly constituted Province of Orissa in 1936. One of the results of its enhanced status has been an increase of population from 65,263 (in 1931) to over 100,000.

Cuttack lies on a narrow strip of land between the River Mahanadi and its tributary the Kathjuri. The rivers have silted with the result that the present river beds are in places above the town level : embankments along both rivers prevent flooding. During the rains the town becomes waterlogged.

In dry weather sullage water stagnates in the outskirts of the town. The numerous tanks have become disused and overgrown with aquatic vegetation : in them *Anopheles annularis* breeds prolifically. This species is normally zoophilic but when excessively prevalent, as it is in Cuttack, it is an efficient vector of malaria.

Even more important than malaria, as a public health problem in Cuttack, is filariasis, from *Wuchereria bancrofti* carried by *Culex fatigans*.

In March 1948, a DDT house-spraying programme was started. The 10,000 houses were to be sprayed four times a year. Twenty-four gangs can complete the spraying of the town in about seven weeks. The *per caput* cost will be about Rs. 1 : 4 : 0 a year.

The results of the early sprayings were most encouraging. The relative freedom from insect pests has aroused local enthusiasm. It is too early yet to assess the value of the measure in terms of reduced morbidity and mortality.

Norman White

MATHIS, W. & QUARTERMAN, K. D. **Preliminary Field Studies on the use of Heavy Dosages of DDT and Benzene Hexachloride as Residual Mosquito Larvicides.** *J. National Malaria Soc.* 1949, Dec., v. 8, No. 4, 270–79.

DDT has been used as a mosquito larvicide mainly for its immediate effect, no residual action being expected or usually seen [but see UPHOLT *et al.*, this *Bulletin*, 1946, v. 43, 794]. It appears from the work of UPHOLT [*ibid.*, 1947, v. 44, 645] that it is removed in a physical combination with the mud complex. The authors set out to develop a larvicide with residual action effective against culicines as well as anophelines. Test areas were in ponds and borrow pits with variable vegetation cover ranging in size from 0·1 to 2 acres, and containing larvae of *Culex apicalis*, *C. erraticus*, *Uranotaenia sapphirina*, other culicines in smaller numbers and large numbers of anophelines, presumably *A. quadrimaculatus*. Control was assumed to have broken down when any large larvae were recovered. The larvicides were applied as a mist from pressure sprayers working at 30 to 50 lb. per square inch and fitted with mist nozzles which gave a droplet size of 70 to 220 microns [*ibid.*, 645, FERGUSON *et al.*].

The intention was to give a heavy treatment of larvicide in a solvent of about the specific gravity of water distributed as an emulsion. Early experience showed that the degree of dilution and the amount of emulsifier were of little concern. One solvent, known by the trade name PD544C, gave better results than xylene or fuel oil, and was used in later trials, the formula finally used for dilution with an equal quantity of water appears to have been :—

DDT, technical grade	3 lb.
Triton X 155	189 ml.
PD544C	to make 1 gallon

The results may be summarized as follows :—

Larvicide	Dose per acre	Period of Effective Control	Remarks
DDT emulsion	3 lb.	8–16 weeks	Fish killed.
DDT emulsion	1 lb.	3– 5 weeks	Fish reduced.
BHC (10 per cent. gamma) emulsion ...	1 lb.	5 weeks	Fish unaffected.
BHC water wettable powder (25 per cent. gamma) in aqueous suspension	4 lb.	8–11 weeks	Fish reduced.

G. Macdonald

DEONIER, C. C., RAUN, E. S., PEEK, E. H., DAVIS, A. N., Jr. & NOTTINGHAM, E. **A Comparison of DDT and other New Insecticides for Mosquito Control.** *Mosquito News.* 1949, Dec., v. 9, No. 4, 150–52.

"In comparative laboratory tests DDT was slightly more toxic than heptachlor but less toxic than parathion to *Anopheles quadrimaculatus* Say, *Aedes aegypti* (L.), and *Culex quinquefasciatus* Say; TDE and DDT were about equal in toxicity to *Anopheles* larvae and about 10 times as toxic as the methoxy analog of DDT. *Culex* larvae were less susceptible to DDT and TDE but more susceptible to the methoxy analog than were *Anopheles* and *Aedes* larvae. In field tests oil solutions of DDT at 0·006 pound of toxicant per acre gave only 24 percent reduction of anopheline larvae, as compared with 92 percent for parathion. At 0·01 pound per acre, emulsions of parathion gave 90 percent reduction and dusts and oil solutions 97 percent. Parathion in a 1-percent solution in fuel oil applied at 0·05 pound of toxicant per acre was effective against *Culex quinquefasciatus* breeding in sewage-polluted water."

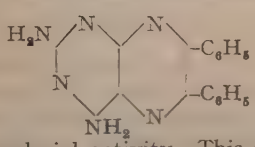
[TDE is DDD or dichlor diphenyl dichlorethane.]

BELTRÁN, E. & VILLASANA, L. Infectividad del plasma, filtrado y sin filtrar, en el paludismo aviario. [**Infectivity of Filtered and Unfiltered Plasma in Avian Malaria.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1949, June, v. 10, No. 2, 147–53. English summary.

The risk of transmitting malaria infections during blood transfusion prompted this investigation as to how far the risk would be obviated by the substitution of plasma for whole blood in such transfusions. The experiments were made with *Plasmodium gallinaceum.* The two donor birds were very heavily infected, 81 and 84 per cent. of the erythrocytes being parasitized. The birds inoculated were chicks five weeks old. Five chicks were inoculated with plasma obtained by 15 minutes' centrifuging at 2,500 r.p.m. : some erythrocytes could be found in the plasma. All chicks became infected. Two other chicks were inoculated with plasma after double centrifuging as above, two periods of 15 minutes. Though microscopic examination revealed no erythorcytes both chicks developed infection. Five chicks were inoculated with plasma obtained by centrifuging for 15 minutes at 2,500 r.p.m. and subsequently passed through a Seitz EK filter : none of the five chicks showed any sign of infection during the 40 days' period of observation. *Norman White*

GREENBERG, J. **The Antimalarial Activity of 2,4-Diamino-6,7-Diphenyl Pterin ; its Potentiation by Sulfadiazine and Inhibition by Pteroylglutamic Acid.** *J. Pharmacol. & Exper. Therap.* 1949, Dec., v. 97, No. 4, Pt. 1, 484–7. [10 refs.]

On testing a number of synthetic pterins against *P. gallinaceum* infections of chickens, it was found that 2,4-diamino-6, 7-diphenylpyrimido (4,5-d) pyrazine (DR 15,791)



showed moderate antimalarial activity. This substance was known to be an antagonist of pteroylglutamic acid for certain organisms. The effect of the latter on the antimalarial activity of the above pterin was therefore investigated. Both substances were administered to chickens in gelatin capsules twice daily for four days and a dosage of 0·20 mgm. per gm. body weight of the acid

caused a significant diminution in the activity of the pterin, the effect being, up to a point, more pronounced with increased dosage. It had also been shown that some synthetic pterins exerted a synergic effect with sulphonamides against certain bacteria capable of synthesizing pteroylglutamic acid. In the same way a synergic effect was noted when the above pterin DR 15,791 was used with sulphadiazine in treatment of chicks infected with *P. gallinaceum*, as had previously been found for paludrine [proguanil] [this *Bulletin*, 1949, v. 46, 119]. A similar effect with sulphadiazine was shown by other pterins which themselves possessed little or no antimalarial activity. Both paludrine and DR 15,791 require approximately the same amount of pteroylglutamic acid to inhibit their activity. It is suggested that the mode of action of these two substances may be similar, possibly through giving rise to the same substance in the body. [The similarity in structure claimed by the author for paludrine and DR 15,791 will in the reviewer's opinion, not be readily appreciated.] *J. D. Fulton*

COATNEY, G. R., GREENBERG, J., COOPER, W. C. & TREMBLEY, Helen L. **Antimalarial Activity of Aureomycin against** *Plasmodium gallinaceum* **in the Chick.** *Proc. Soc. Exper. Biol. & Med.* 1949, Dec., v. 72, No. 3, 586–7.

The authors have found that aureomycin exercises prophylactic and therapeutic activity against *P. gallinaceum* infections of the chick. In testing against the erythrocytic forms of the parasite, week-old chicks were inoculated intravenously with 16×10^6 parasitized red cells, a few hours after the first dose of drug had been given intramuscularly or orally. Treatment was continued twice daily for four days. On the fifth day stained blood smears were examined and the percentage of parasitized red cells determined. Doses of 80 mgm. per kgm. on eight occasions by the intramuscular route or approximately the same amount orally was found to effect a reduction in parasitaemia. On a weight basis the activity of aureomycin was about $\frac{1}{4}$ that of quinine.

In testing for causal prophylactic activity, birds of the same age were used and inoculated in the pectoral muscles with sporozoites equivalent to one whole mosquito. In further experiments birds 45 weeks old were used and inoculated with 1/100 the above dosage of sporozoites. The drug was given orally as above in doses of 75 mgm. and 150 mgm. per kgm. on eight occasions. In all cases the appearance of parasites in the blood was delayed and some birds failed to develop infection. In testing against late exoerythrocytic forms, chicks one week old were treated with 100 mgm. per kgm. of drug twice daily for seven days, starting when blood infection was first noted. Exoerythrocytic forms were not detected in four of five birds and death was prevented, but blood forms appeared soon after treatment ended. *J. D. Fulton*

TRYPANOSOMIASIS

LE ROUZIC & KOCH. Le Service Général d'Hygiène Mobile et de Prophylaxie en A.O.F. Etude historique et statistique. [**Historical and Statistical Account of the Mobile Hygiene and Prophylaxis Service in French West Africa.**] *Bull. Méd. de l'Afrique Occidentale Française.* (*Journées Méd. de Bobo-Dioulasso 24 au 29 Jan. 1949.*) 1949, No. Spéc., 9–35, 2 pls.

A conference of senior officers of the *Service Général d'Hygiène Mobile et de Prophylaxie* ("S.G.H.M.P.") of French West Africa was held in January 1949

at Bobo-Dioulasso, Haute Volta, the headquarters of the Service. A special number of the *Bull. Méd. de l'Afrique Occidentale Française* is devoted to the proceedings, which covered various aspects of trypanosomiasis, leprosy, malaria and demography. This, the introductory paper, describes the history of the Service. In 1932 the increasing prevalence of trypanosomiasis led to the formation of a Sleeping Sickness Service under JAMOT, and mobile teams dealt with 52,000 cases of this infection during the following year. The Service's range of activities was then extended to general sanitary surveys, vaccinations and measures against epidemics in general, but the campaign against sleeping sickness was soon found to suffer from this diffusion of energies. A spearhead of more intensive action against trypanosomiasis was therefore established in Togo in 1938, the measures taken including the formation of a school for hospital orderlies and one for microscopists. This was followed in 1939 by the establishment of the "*Service Général Autonome de la Maladie du Sommeil*" ("S.G.A.M.S.") for the whole of French West Africa and Togo, under Colonel MURAZ, technically and financially separate from the general health service and responsible directly to the Governor-General. The Territory was parcelled out into "special sectors," where the incidence of trypanosomiasis was relatively high, and "annex sectors," where it was relatively low. Headquarters were established at Bobo-Dioulasso, regulations were laid down for such measures as the issue of "sanitary passports" in endemic areas, the location of "*hypnoseries*," other control measures, and special attention was given to the development of a Sleeping Sickness School at Ougadougou (which was transferred in 1944 to Bobo-Dioulasso under the name of the Jamot School).

In 1942, LE ROUZIC became head of this Service, and in 1944 it was again decided that the control of sleeping sickness alone was too limited an objective. Wider sanitary aims were therefore conceived by creating, in place of the S.G.A.M.S., the S.G.H.M.P., with limited autonomy, under the authority and control of the Directors General of Public Health. The Marchoux Institute at Bamako, concerned with leprosy, became a unit of the Service. In 1948 a malaria section was established and began operations in many parts of the country, and it is intended that the next targets should be yaws, syphilis and tuberculosis.

In December 1939, there were 175,934 cases of sleeping sickness in the 31 special sectors (population 3,958,328) and the 43 annex sectors (population 4,268,168) of French West Africa and Togo. Experience showed, after some years, that greater efficiency and economy should result by combining the sectors, with their separate control teams, into larger groups ("*groupements*"), each comprising three or more sectors, and this reform was begun in 1947. In December 1939 there were 18 medical officers, one pharmaceutical officer, 39 higher-grade assistants including 25 African doctors, and 620 hospital orderlies. A table shows the fluctuations in staffing arrangements, year by year, till 1948, when there were 16 officers, 50 higher-grade assistants including 35 African doctors, and 873 hospital orderlies. In 1944 the age of admission to the Jamot School for orderlies was raised from 15 to 17 years; the course of sleeping sickness instruction there lasts 6 to 9 months, and it now includes instruction in leprosy control at the Marchoux Institute.

Tables show, for each year since 1939, the numbers and types of motor-vehicles used by the Service, and, for each part of the country, the numbers of "*hypnoseries*," "leprosaria" and other buildings, their capacity and whether of permanent or temporary construction. Further tables show, for each district, year by year, the numbers of people examined and of sleeping sickness cases diagnosed. The total number examined was 1,059,485 in 1939; from then till 1948 it has fluctuated between 2,434,265 and 4,470,391 per annum.

The "*index de virus en circulation*" fell steadily from 1·75 in 1939 to about 0·35 in 1948. This index was defined at the International Trypanosomiasis Conference at Brazzaville in February 1948 as

$$\frac{\text{New cases for the year, plus old cases still showing trypanosomes whether peripherally or in the c.s.f.}}{\text{Total population examined}} \times 100$$

The official English translation is "parasite index."]

There are also tables showing the numbers of lumbar punctures performed, the numbers of injections given, the weight of trypanocides injected and the number of patient-days of hospitalization.

As for agronomic control this was scarcely attempted before 1939, except in Togo. Since then it has been practised, almost exclusively in savanna regions, to the extent of 111,840 hectares of bush clearing in 9 years, with "spectacular" disappearance of *Glossina*. In the forest regions, since little benefit can be expected from bush clearing, greatly increased reliance is now being placed on chemoprophylaxis see LE ROUZIC, this *Bulletin*, 1949, v. 46, 1015]. In the three years 1946, 1947 and 1948, the numbers of people who received prophylactic injections were 1,512, 1,489 and 88,299, respectively.

In 1939 standard treatments consisted of atoxyl for first-stage cases, orsanine for intermediate cases, and combined orsanine and tryparsamide for second-stage cases. The "diamidine era" began in 1946, as shown by the consumption of diamidines compared with that of tryparsamide during the years 1945, 1946 and 1947, as follows:—Diamidines: 0·19, 2·06 and 3·00 kgm.; Tryparsamide: 805·6, 608·9 and 398·0 kgm.

Tsetse flies to the number of 138,986 were sent to GASCHEN in Bobo-Dioulasso for identification. A table shows their species-distribution for each of the 8 main divisions of the territory. *G. palpalis* constituted 55·9 per cent., *G. tachinoides* 27·9 per cent. and *G. morsitans* 12·8 per cent. of the total.

In 10 years 9,927,681 vaccinations against smallpox or yellow fever were performed, and figures are also given to show the extent of action taken against leprosy and cerebrospinal meningitis since 1945. *E. M. Lourie*

LE ROUZIC. Trypanosomiase. Résumé des colloques sur la positivité du sang, les réinfestations, les rechutes, la chimio-résistance. [**Summary of Communications on Blood Infection, Reinfection, Relapse and Chemoresistance.**] *Bull. Méd. de l'Afrique Occidentale Française. (Journées Méd. de Bobo-Dioulasso 24 au 29 Jan. 1949.)* 1949, No. Spéc., 41–5.

Blood infections: It seemed that among gland-positive cases of sleeping sickness a higher proportion were positive in thick blood films in forest than in savanna areas. To investigate this in more detail, blood taken from patients who had been reported to be gland-positive but blood-negative was centrifuged several times and re-examined for trypanosomes. In 4 savanna areas 3·0, 6·7, 6·8 and 15·2 per cent. of such patients were thus found to have trypanosomes in the blood. In 2 forest areas the percentages were 18·0 and 39·1 per cent.

Among immigrants from savanna country examined by highly experienced workers in Bobo-Dioulasso over a period of 3 years, 37 showed trypanosomes in the glands only, 24 in glands and thick blood films, and only 6 in blood films alone.

Reinfections: It is generally accepted that if a patient is found to have trypanosomes in the blood or glands without changes in the cerebrospinal fluid about three years after "cure" he is a case of reinfection and not of relapse. Cure is followed by neither immunity nor increased susceptibility to further

infection, and, contrary to the opinion expressed the previous year, there is no difference in symtomatology between reinfections and first infections.

Relapses: Reappearance of trypanosomes during a course of treatment may be attributable to a relapse, but an example is cited from a highly endemic area in which it was not easy to disentangle the factors of relapse, reinfection and chemo-resistance.

Chemo-resistance: Sporadic cases of chemo-resistance are reported from time to time in all parts of French West Africa, but there is no true focus of chemo-resistant infection. Such cases as have been reported may be attributed to inadequate treatment, a bad batch of drugs, introduction of a new strain or the fact that arsenicals have long been used in a particular area. [The last two explanations, "*apport d'une nouvelle souche, ancienneté d'un foyer traité par les arsenicaux*," deserve more than the mere mention made in the article under review. They imply the emergence of foci of resistant infection such as have been reported in the Belgian Congo (VAN HOOF, this *Bulletin*, 1947, v. 44, 1048), and fuller details would be of considerable interest.]

It is the general experience that trypanosomes cannot be found in the blood of chronic cases, stubbornly refractory to treatment, though they may from time to time be seen in the cerebrospinal fluid of such cases. *E. M. Lourie*

GASQ. Albuminorachie, glycorachie et glycémie comparées chez le noir sain et chez le noir trypanosomé. Etude des variations de la glycémie sous l'action de la lomidine. [**Albumin and Glucose Content of the Cerebrospinal Fluid and Glucose Content of the Blood in Normal and Trypanosome-Infected Africans. The Influence of Lomidine on Blood Glucose.**] *Bull. Méd. de l'Afrique Occidentale Française. (Journées Méd. de Bobo-Dioulasso 24 au 29 Jan. 1949.)* 1949, No. Spéc., 87–97.

The cerebrospinal fluid studies reported in this paper were prompted by the conclusions and recommendations of the International Trypanosomiasis Conference at Brazzaville in February 1948 [see this *Bulletin*, 1948, v. 45, 875; footnote to abstract of a paper by HILL]. The persons examined were all members of the French Soudanese racial group, predominantly Bobos and Mossis, all of very low economic standing, and of essentially uniform dietary habits based on farinaceous substances with only rare additions of meat or fish.

Of 50 cerebrospinal fluids from healthy subjects examined by the method of SICARD and CANTALOUBE 86 per cent. showed between 15 and 22 mgm. protein per 100 cc. (normal limits according to the author), 10 per cent. showed 23 to 25 mgm. (latter figure being the upper limit for first stage infection according to the Brazzaville Conference) and 4 per cent. showed 26 to 31 mgm.

The method of Sicard and Cantaloube was compared with the more precise but more cumbersome iodine titration method of BAUDOUIN, LEWIN and HILLION. For this part of the work, 156 fluids were examined, half from normal subjects, and the other half from sleeping sickness patients. There was poor correspondence between results obtained by the two methods. In 85·2 per cent. of the 156 comparisons the Sicard test gave lower values than that of Baudouin; and any one finding by the former method corresponded with a disconcerting range of values given by the latter. For example, 30 fluids which registered 22 mgm. per 100 cc. by the Sicard method ranged from 13·6 to 28·2 mgm. when tested by that of Baudouin. Discussing suitable alternatives to the Sicard method, the author rejects the diaphanometric method of RAVOUT and BOYER since this necessitates special tubes and reagents

and delicate diluting operations. He recommends a direct nephelometric method, for details of which the reader should refer to the paper under review or to SICÉ's book, "*Trypanosomiase Humaine.*"

The author then turns to the glucose content of the blood and cerebrospinal fluid, in amplification of his own earlier reports [this *Bulletin*, 1949, v. 46, 914 and 918]. If 0·90 to 1·10 gm. per litre be accepted as the normal blood sugar range, the following results were given by 115 uninfected subjects, 32 in the first stage of sleeping sickness and 40 in the second stage :—

	Uninfected subjects %	1st Stage cases %	2nd Stage cases %
Hypoglycaemic	38·2	59·3	50
Normal	47	25	45
Hyperglycaemic...	14·8	15·6	5

There is therefore a tendency towards hypoglycaemia among the uninfected, this tendency being accentuated during infection.

The glucose content of the cerebrospinal fluid was studied in 52 normal subjects, in 25 suffering from the first stage, and 35 in the second stage of infection. Here also there was a tendency towards low concentrations in the uninfected, accentuated during infection. Abnormally low figures (35 to 40 mgm. per 100 cc.) were given by 4 per cent., 8 per cent., and 14 per cent., of the uninfected, first-stage and second-stage patients, respectively.

The influence of lomidine treatment on blood sugar was studied in 9 uninfected subjects, in 10 first-stage and 10 second-stage patients, with results similar to those already reported by the same author [this *Bulletin*, 1949, v. 46, 918].

E. M. Lourie

LE ROUZIC. Traitement curatif par pentamidine et lomidine. [**Curative Treatment by Pentamidine and Lomidine.**] *Bull. Méd. de l'Afrique Occidentale Française.* (*Journées Méd. de Bobo-Dioulasso 24 au 29 Jan. 1949.*) 1949, No. Spéc., 47–51.

When pentamidine was first authorized for treatment in the bush in French West Africa in 1946, the prescribed course was 5 injections of 3 mgm. per kgm. intramuscularly at intervals of 48 hours. Only first-stage cases were treated, and of 2,211 such patients there was only one subsequent blood relapse, but 7·40 per cent. passed into the second stage.

During 1947 and 1948 lomidine, the French variant of pentamidine, gradually replaced the latter. Two tables show, for each sector in the territory, the extent to which this replacement occurred, together with the results of treatment with each drug. Over the two-year period 3,640 patients received pentamidine and 2,423 lomidine. Of patients followed up for 12 to 18 months, 7·6 per cent. of those treated by pentamidine and 7·3 per cent. treated by lomidine have passed into the second stage.

These drugs should only be used when there is not the slightest doubt that the cerebrospinal fluid is normal, and it is suggested that most of the cases

which proved to be in the second stage after treatment may in fact have already entered that stage at the time of treatment. Gland and blood relapses are extremely rare.

In spite of some shortcomings the advantages of these compounds are such that their use will be extended to all the "annex sectors", in which they will be applied to all patients in the first stage of infection. The main advantages are (*a*) shortness of the treatment-course; (*b*) trypanocidal activity in gland juice and blood; (*c*) absence of local reaction; (*d*) absence of ocular or renal sequelae and (*e*) good repute of these drugs among the populace.

If the intramuscular dose were increased to 4 mgm. per kgm., 5 such injections at intervals of 48 hours should be adequate for first-stage infections.

E. M. Lourie

LE ROUZIC. Nouveaux trypanocides en expérimentation. [**New Trypanocides under Investigation.**] *Bull. Méd. de l'Afrique Occidentale Française (Journées Méd. de Bobo-Dioulasso 24 au 29 Jan. 1949.* 1949, No. Spéc. 63–72.

BULL. MÉD. DE L'AFRIQUE OCCIDENTALE FRANÇAISE. [JOURNÉES MÉD. DE BOBO-DIOULASSO 24 AU 29 JAN. 1949.] 1949, No. Spéc., 73–7. Les conclusions de la Commission du Mel. B. [**Conclusions of the Commission on Mel. B.**] [SCHNEIDER, J., MARCHALANT, LOTTE, BUISSON, B. & DIALLO].

The compounds with which these two papers deal are those of Dr. E. A. H. FRIEDHEIM. A recent report on field trials in French West Africa with some of them was made by LE ROUZIC and LAPEYSSONNIE [this *Bulletin*, 1949, v. 46, 919, where references to previous published work may be found]. The first of the two papers now under review deals with the most recent of Friedheim's compounds. The second is the report of a commission which has enquired specifically into the progress of field trials with Mel B [see FRIEDHEIM, *ibid.*, 711].

Pentavalent arsenicals are trypanocidal only after they have been reduced to their trivalent forms, but the latter are more toxic than the former. Dr. Friedheim therefore set out to reduce the toxicity of the trivalent melarsen oxide (also known as melox) by combining it with B.A.L. (British anti-lewisite), the product being called Melarsen B.A.L. or Mel.B. Similar combinations have been made of B.A.L. with the trivalent derivatives of other pentavalent arsenicals, such as tryparsamide, stovarsol and carbarsone. These have been called T.P.B., S.T.B., and C.B.B., respectively.

In Friedheim's opinion conjugated compounds of this type combine high trypanocidal activity and diminished toxicity with a greatly enhanced ability to improve the cerebrospinal fluid picture. MSb III, the trivalent antimonial analogue of melarsen oxide, has also been combined with B.A.L. and called MSbB. Another new combination mentioned in the first of these papers is Detox, described as detoxified tartar emetic.

The information given on the progress of field trials with these various compounds is somewhat fragmentary, and is given separately for each centre where the trials were carried out. The tables below are the present reviewer's attempts to present the French workers' conclusions in concise form. Table I shows Colonel Le Rouzic's figures for drugs other than Mel B. Table II shows the figures for Mel. B given by Le Rouzic and by the Mel B Commission, respectively.

TABLE I.

Results with compounds other than Mel. B, according to LE ROUZIC.

Stage of disease	Treatment	Cases (a)	Success (b)	Failure (c)	Died (d)	Indeterminate or disappeared (e)	Provisional failure-rate $\frac{c+d}{a-e}$
1st stage...	T.P.B. ...	2	2				0/2
	MSb V ...	109	67	13	19	10	32 per cent.
	Combined MSb and MSb B...	90	64	2	14	10	20 per cent.
	Detox ...	10	9	1			1/10
1st and 2nd stage (not clearly differentiated in original text)	Melox ...	40	32	5	3		20 per cent.
	S.T.B. ...	6	1	3	1		4/6
2nd stage...	Melox ...	33	22	6	2	3	27 per cent.
	T.P.B. ...	10	5	2		3	2/7
	C.B.B. ...	6	5		1		1/6
	MSb V ...	15	12	3			20 per cent.
	Combined MSb and MSb B...	16	13	3			19 per cent.
	Detox ...	5	3	2			2/5

TABLE II.

Results with Mel. B, according to LE ROUZIC *and the* COMMISSION ON MEL. B, *respectively.*

Stage of disease	Authority	Cases (a)	Success (b)	Amelioration (c)	Failure (d)	Died (e)	Indeterminate or disappeared (f)	Provisional failure-rate $\frac{d+e}{a-f}$
1st stage	LE ROUZIC	40	30	5	2	3		12·5 per cent.
	COMMISSION	41	39		1		1	2·5 per cent.
2nd stage	LE ROUZIC	174	97	43	12	7	15	12 per cent.
	COMMISSION	135	61	48	5	7	14	10 per cent.
Chronics, failed after treatment by other drugs	LE ROUZIC	25	3	17	1		4	5 per cent.
	COMMISSION	37	16	14	3	1	3	12 per cent.

Le Rouzic's figures for Mel. B in first-stage cases seem less favourable than those of the Commission, and since there is also a noticeable difference of

degree in the enthusiasm expressed in these two reports, it is worth attempting exact translations of their main conclusions, as follows :—

LE ROUZIC :—

Advantages : (1) Extremely active trypanocide (according to Captain LOTTE) in blood, glands and cerebrospinal fluid. There are no relapses during treatment.

(2) Non-toxicity to kidney and optic nerve.

(3) Sensation of well-being experienced by the patient and often apparent to the physician.

(4) A single course of 4 injections suffices for the first stage, and two such courses for the second ; disappearance of trypanosomes from the body fluids is certain, and the body will do the rest.

Disadvantages : (1) There are sometimes marked disturbances of the cerebrospinal fluid for 2 months.

(2) The position is grave when the cell-count and albumin-content of the cerebrospinal fluid increase in parallel.

(3) The effect is sometimes severe. Loss of weight in some second-stage cases one week after the end of the second course.

(4) One observer noted vein scleroses and "benign" diarrhoea.

COMMISSION ON MEL. B :—

Conclusions : (1) Remarkable clinical action. The patient is veritably resurrected.

(2) Excellent trypanocide both in the lymphatico-blood system and the cerebrospinal fluid.

(3) The cerebrospinal fluid is always eventually improved, though there is sometimes temporary deterioration within 3 months of treatment.

(4) Rapidity of the treatment-course.

(5) Old cases resistant to standard forms of treatment may be improved, sometimes spectacularly.

(6) No complications (*"pas de troubles"*).

Accidents : (1) Only 3 of the deaths among the 135 second-stage cases are said to have been certainly connected with the treatment.

(2) Untoward effects vary with different races and perhaps with different drug batches. The most frequent are headaches, fever, vomiting, erythemas and, in one sector alone, vein scleroses.

Both reports agree that Mel. B is more toxic than lomidine. Le Rouzic says the latter is therefore preferable in first-stage cases ; and the Commission says that Mel. B is undoubtedly the best drug for the second-stage cases but in view of the relatively high proportion of first-stage cases which progress to the second stage after treatment with lomidine, Mel. B is advisable in early cases presenting clinical signs, such as headaches or somnolence, suggestive of the meningeal barrier having been crossed, or where the cerebrospinal fluid has exceeded the limits of normality as defined at the International Conference at Brazzaville in 1948 [see footnote to abstract of paper by HILL, this *Bulletin*, 1948, v. 45, 874–5]. *E. M. Lourie*

LE ROUZIC. Chimio-prophylaxie en A.O.F. [**Chemoprophylaxis in French West Africa.**] *Bull. Méd. de l'Afrique Occidentale Française.* (*Journées Méd. de Bobo-Dioulasso 24 au 29 Jan. 1949.*) 1949, No. Spéc., 53–61.

Previous communications on chemoprophylaxis against sleeping sickness in French West Africa have been made by BRUN-BUISSON *et al.* [this *Bulletin*, 1949, v. 46, 123] and by LE ROUZIC [*ibid.*, 1015]. The present paper recapitulates those reports and describes further progress in considerable detail, especially in regard to dates and localities.

Most of the work was done in two specially selected sectors in Guinea where the indices of new infection were 0·66 and 1·12 per cent., and in two in Casamance where the indices were 0·74 and 0·76 per cent. Throughout French West Africa the numbers of people who received prophylactic treatment, and the drugs used during 1946 to 1948, were as follows :—

Year	Pentamidine	Lomidine	MSb 110
1946	1,512	—	—
1947	1,125	—	430
1948	—	87,869	364

Follow-up 5 to 12 months after treatment produced results as below :—

Drug	Cases followed up	Found infected
Pentamidine	2,637	1
Lomidine	13,146	7
MSb 110	794	0

In general the index of new infection among non-protected controls was the same at the follow-up as at the start of the experiment.

Chemoprophylaxis will replace agronomic prophylaxis in forest areas as well as in some savanna areas, and the opinion is expressed that it should be capable of reducing the infection-rate in man, hence in the tsetse fly, practically to zero.

It is intended to give a second injection of lomidine in some areas one year after the first injection.

[In view of the potential value of MSb as a prophylactic agent (see ROLLO WILLIAMSON and LOURIE, this *Bulletin*, 1950, v. 47, 333), it is worth extracting from this report the information given on trials with MSb 110, which is presumably identical with MSb used by ROLLO *et al.* The dose and details of administration are unfortunately not stated, but other details can be collected into a table as below :—

Observer	No. of villages	Index of new infection	No. of people treated	Time of follow-up (mths)	Follow-up: Treated cases: examined	Treated cases: infected	Controls: examined	Controls: infected
FRIEDHEIM ...	4	1·31, 1·36, 2·81, 6·42	364	4–5	364	0	80	3
DIALLO ...	1	4·22	50	8	50	0	29	0
BRUN-BUISSON	1	?	380	4	380	0	?	3

It seems clear, therefore, that the high promise of MSb in laboratory infections has not been lessened by these field trials, but complete conviction unfortunately miscarries because of scanty information on controls.] *E. M. Lourie*

SCAILLET, L. & HADDAD, E. La trypanosomiase dans le Secteur des Cataractes. Premiers résultats de la chimioprophylaxie à la pentamidine. [**Trypanosomiasis in the Cataracts Sector, Belgian Congo. Chemoprophylaxis by Pentamidine.**] *Ann. Soc. Belge de Méd. Trop.* 1949, Sept. 30, v. 29. No. 3, 349–64.

The Cataracts Sector of the Belgian Congo is divided into two zones, North and South, by the Matadi-Leopoldville Railway. The population in 1947 was 184,000. From 1942 to 1948, inclusive, the number of cases of sleeping sickness rose steadily from 890 to 1,307. The endemic picture was quite different in the two zones ; the North presented relatively stable foci of infection which could be kept under control but not eliminated, while the South was characterized by sporadic localized outbreaks, often of some violence, and commonly clearing up in 1 to 3 years. The peculiarities of the epidemiological picture in the southern zone are attributed to the constant influx of infected persons from the neighbouring territory of Angola.

It was decided in 1948 to give prophylactic pentamidine to all the inhabitants of the most heavily infected villages (*i.e.*, those with infection rates of more than 1 per cent.) in both zones of the Sector. Accordingly 19,909 people received an intramuscular injection of 5 mgm. per kgm. of pentamidine isethionate. This was immediately preceded by examination of the entire population, which revealed 605 new cases (43·6 per cent. with trypanosomes in glands alone, 43·3 per cent. in blood alone, and 13·1 per cent. in glands and blood). It is incidentally suggested that the presence of trypanosomes in the blood alone implies an earlier phase of infection than that associated with trypanosomes in the glands. To test this a number of patients were lumbar-punctured. The proportion of cases with the normal number of cells (0 to 5 per cmm.) in the cerebrospinal fluid was 92·2 per cent. of 206 who had trypanosomes in the blood alone, 88 per cent. of 50 who had trypanosomes in the blood and glands, and 86·6 per cent. of 390 who had trypanosomes in the glands alone.

Untoward immediate effects of the pentamidine injection were observed in about 0·1 per cent. of the total treated, the incidence in the districts ranging from 0 to about 1 per cent. Symptoms were those now well known to be associated with the aromatic diamidines, described here as "lipothymic crises", and consisting of fainting, thready pulse, salivation, and occasionally defaecation. In one centre, however, 12 people in the first 400 to be treated presented, in addition to the well-recognized symptoms, spasmodic tremors of the upper limbs and violent colic. They were all females in the menstrual period, and the authors therefore suggest an association between pentamidine intolerance and endocrine dysequilibrium, as has already been suspected in connexion with propamidine. For the remaining 1,800 people in this particular centre the dose was given in two portions, of 3 and 2 mgm. respectively, separated by an interval of 2 hours. There were no further toxic incidents. The follow-up showed that this divided dosage involved no impairment of prophylactic efficacy.

Six months later 14,533 of the 19,909 treated people were re-examined and given a second prophylactic dose. If there had been no previous treatment about 200 new infections would have been expected at this visit, but only 15 cases were established by finding trypanosomes, with 10 suspects on grounds of suggestive symptomatology. Examination of the cerebrospinal fluid seemed to indicate that 13 of the 15 proved cases had become infected since the prophylactic treatment.

In summary, at the first visit the rate of new infections was 3·3 per cent. of 20,686 people examined ; 19,909 received prophylactic pentamidine. Six

months later the rate of new infections among the latter was 0·17 per cent., while it was 1·0 per cent. among 4,261 people not previously treated. It is intended to repeat the prophylactic treatments at intervals of six months for 2 or 3 years. *E. M. Lourie*

VILAIN. La prophylaxie agronomique en A.O.F. [**Sleeping Sickness Control by Agronomic Methods in French West Africa.**] *Bull. Méd. de l'Afrique Occidentale Française.* (*Journées Méd. de Bobo-Dioulasso 24 au 29 Jan. 1949.*) 1949, No. Spéc., 79–85.

A paper on this general subject has recently been published by LE ROUZIC [this *Bulletin*, 1949, v. 46, 922]. In the present communication it is recorded that 1,500 tsetse fly foci were treated from 1939 to 1946, the total area cleared being 100,000 hectares. A general description is given of the methods of clearing used. Experience has shown that such work is not particularly useful in forest and moist savanna regions, but it is undoubtedly valuable in the drier savanna areas, where many breeding places have thus been eliminated. Specially troublesome were the "sacred groves", some of which formerly "swarmed" with *G. tachinoides*. Where possible, cleared areas have been put into cultivation thus ensuring permanent disappearance of the tsetse fly.

Special mention is made of the position in the Ougadougou sector, where a survey in 1948 of 83 former fly foci treated by "*prophylagro*" since 1942 revealed only 3 such foci remaining, these being on the banks of the Red Volta. In the Tiogo-Koudougou sector 158 foci were reduced to 20, nearly all along the Black Volta; and in the Yako region about 200 were reduced to 2.

Since agronomic methods of sleeping sickness control have proved to be of such little value in forest regions and in well-watered savanna areas with thick marginal vegetation, they have been given up throughout the Guinea, the Ivory Coast, and Lower and Middle Casamance, where indeed sleeping sickness is most prevalent. They are to be continued in regions of lower endemicity, and the writer says this may seem paradoxical, but it is these regions, situated in the drier Northern latitudes, which are specially amenable to agronomic methods of control. The areas concerned are Haute-Volta, Soudan, part of Senegal, Togo and Northern Dahomey. The guiding principles are to be those of "selective clearing" as enunciated by MORRIS in the Northern Territories of the Gold Coast. Work along these lines is already current in Bamako (Soudan), Bobo-Dioulasso and Gaoua (Haute Volta) and Natitingou (Dahomey).

The use of cured sleeping sickness patients for the manual labour entailed in this work is no longer thought to be advantageous. Their number is now insufficient in many of the areas concerned; many are unwilling, and only volunteers can be used; experience shows that they are just as liable to re-infection as others are to a first infection; and "clean" volunteers can be adequately protected by an injection of pentamidine.

Stress is laid on the importance of putting into cultivation the riverine areas cleared. With regard to population resettlement this question does not arise in heavily infected savanna areas, simply because such areas no longer exist as a result of mass treatment and agronomic prophylaxis in the past. But in the more or less near future resettlement may have to be considered from the increasingly populated zones towards well-watered regions such as the valleys of the White and Red Voltas. Tsetse flies are numerous in these areas, but techniques of chemoprophylaxis and agronomic prophylaxis are by now sufficiently developed to cope with the situation when it will arise.

E. M. Lourie

VERHAEGHE. Note sur l'action des bombes fumigènes D.D.T. sur les glossines. [**Action of DDT Smoke Bombs on** *Glossina*.] *Ann. Soc. Belge de Méd. Trop.* 1948, Dec. 31, v. 28, No. 4, 445–8, 1 fig.

The tests were done in an area along a stream which had been cleared of bushes (but not trees) for a distance of 80 metres and a width of 80 metres decreasing to 60 metres. In the centre of this area, at a point where a path crossed the stream at right angles, a Lenillon-type tsetse fly trap was placed, to give an indication of any change of fly density which might be caused by the treatment. Pre-treatment checks resulted in about 20 *Glossina palpalis* being caught per day.

In the first test, three DDT smoke bombs were discharged along the course of the stream, one in the centre of the clearing and the other two in the forest edge. In the second test, four bombs were discharged, all of them in the forest edge. The tests were done at daybreak with very little wind, and the smoke dispersed well in all directions from the points of discharge.

The results, judging by numbers caught in the fly trap, indicated that neither treatment had any effect in reducing the fly population.

J. R. Busvine

SULLIVAN, Thelma D., MCGREGOR, T., EADS, R. B. & DAVIS, D. J. **Incidence of** *Trypanosoma cruzi*, **Chagas, in** *Triatoma* (**Hemiptera, Reduviidae**) **in Texas.** *Amer. J. Trop. Med.* 1949, July, v. 29, No. 4, 453–8, 1 fig. [13 refs.]

From 1941 to 1947 specimens of *Triatoma* were collected in 40 counties in Texas. The majority of the bugs were taken from the nests of wood rats (*Neotoma micropus* and *N. mexicana*) constructed in " prickly-pear " thickets and from under the bark of nearby mesquite trees. Others were obtained from light traps and some came from domestic sources on man, cat or dog.

Altogether, 1,631 specimens were collected and they included six species : *Triatoma gerstaeckeri*, *T. lecticularius*, *T. sanguisuga*, *T. protracta*, *T. neotomae*, *T. rubida* and a number of unidentified specimens. A total of 859 were examined for *Trypanosoma cruzi* and 286 were found infected (33·3 per cent.). Occasionally viable forms of trypanosomes were found in dead bugs but it had been shown that it was possible to identify *Trypanosoma cruzi* as long as 15 days after the death of the bug.

Indigenous human cases of American trypanosomiasis have not yet been reported in the United States in spite of the presence of infected triatomids and their frequent contact with man.

H. S. Leeson

PIZZI, T., AGOSIN, M., CHRISTEN, R., HOECKER, G. & NEGHME, A. Estudios sobre immunobiologia de las enfermedades parasitarias : I. Influencia de la constitución genetica en la resistencia de las lauchas a la infección experimental por *Trypanosoma cruzi*. [**Studies on the Immunobiology of Parasitic Diseases. I. Influence of Genetic Constitution in the Resistance of Mice to Experimental Infection by** *Trypanosoma cruzi*.] *Bol. Informaciones Parasitarias Chilenas.* 1949, Oct.–Dec., v. 4, No. 4, 48–9.

The English summary appended to the paper is as follows :—

" Experiments made on pure strains of mice showed that some (A (55), S57, Dba and C3H) are highly susceptible to the experimental infection with *T. cruzi* ; other (Rockefeller, Ay, Ak and Daab) are relatively resistant to the infection.

" Since the only variable was the genetic constitution of mice, it is concluded that it has clear influence upon the resistance of mice to the experimental infection by *T. cruzi*."

JARPA, A., CHRISTEN, R., AGOSIN, M. & PIZZI, T. Ensayos de quimioterapia en la enfermedad de Chagas experimental. I. Aureomicina. [**Studies in the Chemotherapy of Experimental Chagas's Disease. I. Aureomycin.**] *Bol. Informaciones Parasitarias Chilenas.* 1949, Oct.–Dec., v. 4, No. 4, 49–51.

The English summary appended to the paper is as follows :—

" a) The administration of Aureomycin to mice experimentally infected by *T. cruzi* resulted in an increased severity of the disease.

" b) The addition of Aureomycin to cultures of *T. cruzi* had no apparent effect upon the multiplication or vitality of the parasite."

COPP, F. C. & WALLS, L. P. **Potential Trypanocides of the N-Heterocyclic Series. Part III. Alkoxy- and Hydroxyphenanthridinium Salts.** *J. Chem. Soc.* 1950, Jan., 311–17.

LEISHMANIASIS

TUCKMAN, E. **Treatment of Chinese Kala-Azar with Sodium Antimony Gluconate.** *J. Trop. Med. & Hyg.* 1949, Oct., v. 52, No. 10, 199–204, 1 chart. [15 refs.]

Sodium antimony gluconate (Pentostam) was used in the treatment of 148 unselected cases of kala azar in central Honan, China. The diagnosis was confirmed by the finding of leishmania in spleen puncture smears. Twenty-five per cent. of the patients had spleens reaching below the costal margin, 64·9 per cent. had a leucocyte count of less than 5,000 per cmm. and albumin was passed in the urine in 21·5 per cent.

The total dosage was according to age, on a sliding scale from 9 ml. for a child weighing 10 kilogrammes to 36 ml. for an adult weighing 50 kilogrammes or over. The dosage was divided in several ways : in 93 cases it was divided into six equal doses, given daily ; in 11 the six doses were given in three days, that is, twice daily ; and in 35 cases it was divided into five equal doses, given daily. In the remainder the treatment was irregular.

Of the 128 patients treated by daily injections, at the end of the course, 102 were free from fever, 7 only showed any reduction in the size of the spleen, 44·2 per cent. had a leucocyte count below 5,000 per cmm. However, after six weeks only 15 of 25 examined had slight splenic enlargement and only 6 per cent. had less than 5,000 leucocytes per cmm.

Leishmaniae were present in the spleen smears at the end of treatment in 32 of 116 cases, in 2 of 36 cases two to four weeks later, and in none of 12 cases six to twelve weeks later.

Sixty-nine patients were " followed-up " 9 to 12 months later and 66 were found to be well, two had relapsed and one died of pneumonia ; of those untraced, 38 had been seen between 2 and 12 weeks after treatment and all except one were apparently cured.

Of the 11 patients who were treated with injections twice daily, three complained of abdominal pain and one patient vomited once. In no case did albumin appear in the urine. Ten patients were seen seven months later and all were apparently cured ; the 11th patient seen one month after treatment was progressing favourably.

The author considers that the most impressive point is the complete absence of unpleasant side-effects with this drug in view of the relatively high

concentration of antimony. He also observes that it is impossible to foretell whether a patient will relapse or not : the two relapsing patients had leucocyte counts of over 13,000 per cmm. within a month of treatment.

He comments on the importance of concentrating the injections within as short a period as possible [*c.f.* Ho, Soong and Li, this *Bulletin*, 1949, v. 46, 815, and Napier, this *Bulletin*, 1950, v. 47, 125].

In an editorial footnote, L. E. Napier observed that 6 of 126 patients developed pneumonia during treatment and a seventh developed it subsequently and died. He states that in his early experience with this drug, in 1936, three of his first seven patients developed pneumonia and died, and wonders whether this drug is peculiarly liable to cause pneumonia. However, the present author in a letter in the same journal (p. 263) refutes this idea, by quoting his figures for treatment by pentamidine in which there was the same percentage incidence of pneumonia (5·4 per cent.) ; with Neostam he had only a slightly lower percentage, 3·7. He shows that pneumonia is commoner in the winter months than in the summer. *L. E. Napier*

Quiroga, M. I., Curia, L. & Ursi, C. G. Leishmaniasis simulando un rinofima. [**Leishmaniasis simulating Rhinophyma.**] *Rev. Argentina Dermatosifilologia.* 1949, Sept.–Dec., v. 33, Nos. 3/4, 118–20, 1 fig.

FEVERS OF THE TYPHUS GROUP

Bieling, R. Untersuchungen über die Wirkungsweise von Fleckfieberantikörpern. [**Investigations into the Mode of Action of Typhus-Fever Antigens.**] *Ztschr. f. Hyg. u. Infektionskr.* 1949, Sept. 28, v. 130, Nos. 1/2, 106–11.

When rabbits were immunized by anti-typhus vaccines and then inoculated intravenously with virulent typhus rickettsiae infection was found to disappear rapidly from the blood, and lice fed on the animals were less readily infected than was the case with non-immunized rabbits inoculated in the same way.

Suspensions of *Rickettsia prowazeki* were not made less virulent by being treated *in vitro* with the serum of immunized rabbits ; they remained fully infective to lice inoculated with them *per rectum.*

It appeared, therefore, that the resistance of the immunized rabbits to infection depended on a synergistic action occurring in the tissues in response to the presence of the rickettsiae. *John W. D. Megaw*

Ruiz Sanchez, F., Ponce de Leon, Estela & Riebeling, Rebeca. Aglutininas para el *Proteus OX19* en los cerdos de Guadalajara, Jal. [**Agglutination of *Proteus OX19* in Pigs in Guadalajara.**] *Medicina.* Mexico. 1949, Dec. 10, v. 29, No. 593, 463–4.

The following is a translation of the authors' summary :—

Investigation of specific agglutinins in the serum of pigs resulted in the finding of agglutination of *Proteus OX19* in 72·3 per cent. of specimens. Titres varied between 1/20 and 1/320. Possible explanations of these findings are suggested and the need for confirmatory experimental evidence is stressed.

H. J. O'D. Burke-Gaffney

Rickard, E. R. **Murine Typhus Fever.** Reprinted from *J. Florida Med. Ass.* 1949, Mar., v. 35, 550–54. [19 refs.]

A general review.

MORLAN, H. B., HILL, E. L. & SCHUBERT, J. H. **Serological Survey for Murine Typhus Infection in Southwest Georgia Animals.** *Pub. Health Rep.* Wash. 1950, Jan. 13, v. 65, No. 2, 57–63. [21 refs.]

"In a limited survey of southwest Georgia animals, exclusive of domestic rats, 3,202 sera from 37 species were examined by the complement fixation test for murine typhus. A low level of natural infection was indicated by the finding of 47 positive sera from 12 species of animals including the opossum, cottontail, fox squirrel, house mouse, rice rat, cotton mouse, old-field mouse, cotton rat, dog, Florida skunk, weasel, and blue jay."

KNIGHT, V., RUIZ-SANCHEZ, F., RUIZ-SANCHEZ, A. & MCDERMOTT, W. **Aureomycin in Typhus and Brucellosis.** *Amer. J. Med.* 1949, Apr., v. 6, No. 4, 407–16, 3 figs. [12 refs.]

Aureomycin was given to 19 patients suffering from murine typhus; the usual doses were 50 to 200 mgm. per kgm. body weight, daily by the mouth, in divided doses at intervals of three hours.

The average duration of the fever after the commencement of treatment was 1·7 days: the response was much the same whether treatment was started as early as the 4th day or as late as the 16th.

One patient was treated with small doses of 25 mgm. per kgm. daily; the result was appreciably less satisfactory than with the larger doses. The optimum dosage was thought to lie between 50 and 100 mgm. per kgm. daily. The treatment was continued for 36 to 48 hours in most cases. The only significant toxic effect was occasional vomiting, which was never so severe as to interfere with the treatment.

Four patients suffering from brucellosis were treated, with similar results, except that in one case there was an exacerbation of the symptoms 48 hours after the treatment was started. One of the patients had meningo-encephalitis and bacteraemia, yet there was a dramatic improvement within 48 hours.

John W. D. Megaw

See also p. 500, JENKINS, **The Ecology and Laboratory Rearing of Chiggers affecting Man in the United States (Acarina, Trombiculidae).**

JENKINS, D. W. **Trombiculid Mites affecting Man. IV. Revision of Eutrombicula in the American Hemisphere.** Reprinted from *Ann. Entom. Soc. America.* 1949, Sept., v. 42, No. 3, 289–318, 15 figs. (14 on 3 pls.). [25 refs.]

AUDY, J. R. **Practical Notes on Scrub Typhus in the Field.** *J. Roy. Army Med. Corps.* 1949, Dec., v. 93, No. 6, 273–88, 2 figs. [32 refs.]

This paper contains in an orderly and concise form a summary of what is known of the prevention of scrub typhus, with special reference to the conduct of military operations in areas in which the disease is liable to occur.

Most of the information contained in the article has already been published [this *Bulletin*, 1950, v. 47, 27], but the author has rendered a valuable service to medical men in the affected countries by relieving them of the necessity for searching the literature, much of which is not readily available.

For those who wish to make a more detailed study of the subject a useful bibliography has been provided. *John W. D. Megaw*

PELLISSIER, A. & TRINQUIER, E. Études sur les rickettsioses humaines et animales en Afrique Équatoriale Française. I. La fièvre rouge Congolaise, fièvre exanthématique africaine. [**Studies of Human and Animal Rickettsioses in French Equatorial Africa. I. The Red Fever of the Congo, an African Exanthematic Fever.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 11/12, 565–80.

The authors have studied 26 cases of a tick-borne rickettsial disease which they regard as being the red fever of the Congo. The chief features of the disease were: (1) a short mild fever lasting less than a week, (2) a variable generalized rash, which was papular, maculo-papular or morbilliform, and (3) an "inoculation chancre" in 20 of the cases, associated with an adenopathy which appeared first in the region affected by the chancre, but later became generalized.

There was usually an initial leucopenia followed by a leucocytosis, up to 15,000 per cmm., and an increase in the mononuclears, up to 60 per cent.

The Weil-Felix response was of the indeterminate type, reactions at titres of 1–100 or over occurred in 13 cases with *Proteus OXL*; in 6 cases with *P. OX19*; and in no cases with *P. OX2* or *OXK*.

In 14 out of 19 cases the rickettsia-agglutination reaction was positive with *R. prowazeki* at titres of 1–100 or over; in one case there was a reaction at 1–40 with *R. mooseri*, and in the same case there was a reaction at 1–80 with the rickettsia of "canine rickettsiosis of Brazzaville".

Most of the cases occurred in the rainy season. There was no evidence of transmission from person to person. *Rhipicephalus sanguineus* was believed to be the vector, and the dog appeared to be the reservoir of infection, though the disease in dogs was inapparent.

Six strains of rickettsiae were isolated from patients, and two from *R. sanguineus* obtained from dogs.

Among 165 guineapigs inoculated with various strains, only 32 gave definite febrile reactions, 49 others gave a hypothermic reaction; there was never a scrotal reaction, even after intratesticular inoculation. Rabbits, mice, and rats were not susceptible, but the chimpanzee and the cercopithecus ape reacted in much the same way as human beings except for the absence of the rash.

Two of the human cases were caused by inoculation with brain suspensions from infected guineapigs.

The rickettsiae did not show cross-immunity with boutonneuse fever, murine typhus, or canine rickettsiosis. Immunity tests against tick-bite fever and the tick-borne typhus of Kenya could not be carried out, but the authors thought that these diseases could be excluded by the differences in the responses of experimental animals.

No definite conclusions were reached regarding the identity of the rickettsiae.

[Most workers will probably prefer to classify the disease provisionally as tick-borne fever of the typhus group rather than call it by a name which has been applied by different observers to several distinct diseases including epidemic and murine typhus, and even dengue.] *John W. D. Megaw*

VALERO, A. **On Typhus of the Rocky Mountain Spotted Fever Group in Palestine.** *Harefuah.* Tel-Aviv. (Foreign Edition). 1949, Dec., Nos. 5/6, 21–3.

This gives a much fuller English summary of the paper referred to in this *Bulletin*, 1949, v. 46, 820.

NELSON, J. W. **Chloromycetin in a Case of Tick Typhus.** *East African Med. J.* 1949, Dec., v. 26, No. 12, 397–8.

" Chloromycetin was given to an elderly diabetic woman with tick typhus starting on the eighth day of the disease.

" Fever abated and the rash faded rapidly.

" Evidence of disease in the central nervous system, the chest and the limbs persisted for more than four weeks."

DE PRADA, J. La fiebre " Q " en España. [**Q Fever in Spain.**] *Med. Colonial.* Madrid. 1949, Nov. 1, v. 14, No. 5, 471–95, 2 figs. & 2 maps. [Numerous refs.]

The existence of Q fever in Spain, already suspected by the author, has been demonstrated by the isolation of *Rickettsia burneti* from the blood of patients in Salamanca and from the tick *Hyalomma savignyi* (often referred to as *H. aegyptium*).

The disease is believed to be widespread in Spain, and arrangements have been made for the diagnosis by modern methods at a central laboratory.

The paper contains a history of Q fever, and a general description of the disease and of the vector tick. There are two maps showing the localities from which cases have been reported and in which *H. savignyi* has been found.

There is a full bibliography with about 140 references. *John W. D. Megaw*

PARKER, R. R., DE PRADA, J., BELL, E. J. & LACKMAN, D. B. **Recovery of *C. burneti* from *H. savignyi* collected in Spain.** *Pub. Health Rep.* Wash. 1949, Dec. 16, v. 64, No. 50, 1616–18.

Two strains of *Coxiella* [*Rickettsia*] *burneti* have been recovered from 16 adult ticks (*Hyalomma savignyi*) collected in April, 1949, from a sheep in the Province of Salamanca, Spain.

It is stated that this is the first proof of the occurrence of *C. burneti* in Spain although its clinical presence has been suspected for some time by one of the authors [see DE PRADA above]. This paper, however, makes no reference to the isolation of the rickettsia from the blood of patients.

In a footnote to the paper it is stated that Dr. R. R. Parker died 4th September, 1949. The death of this very able worker is a great loss to rickettsial research.

John W. D. Megaw

GERMER, W. D. & HENI, F. Die Komplementbindungsreaktion bei Q(ueensland)-Fieber. [**The Complement-Fixation Reaction in Q Fever.**] *Ztschr. f. Hyg. u. Infektionskr.* 1949, Nov. 9, v. 130, No. 3, 166–72.

The authors carried out a considerable number of complement-fixation tests on Q-fever patients during an epidemic near Tübingen. The antigen used was prepared from the Nine-Mile strain of *Rickettsia burneti*. In 11 cases the tests were carried out on two or more occasions. The earliest positive reaction occurred on the 7th day. In one case the reaction was still negative on the 20th day and the highest titre, observed on the 25th day, was only 1–32 ; this was a severe case. In other severe attacks high titres were often observed. In abortive attacks the highest titre observed was 1–128.

Long persistence of the reaction was sometimes noticed ; in one case the titre was 1–1,024 on the 142nd day, after a severe attack ; in another it was 1–512 on the 134th day, after a mild attack. The reaction was highly specific.

[The letter Q stands for Query, not for Queensland as stated by the author.]

John W. D. Megaw

PLAGUE

GROSS, B. & BONNET, D. D. **Snap Traps versus Cage Traps in Plague Surveillance.** *Pub. Health Rep.* Wash. 1949, Sept., 23, v. 64, No. 38, 1214–16.

Two kinds of rat traps were tested in the Hamakua District of the Island of Hawaii; 100 snap traps and 100 cage traps were set alternately 50 feet apart along a rodent trap line. The treatment was standardized for all traps and they were examined and set daily from 1st July to 25th November, 1946, making 10,900 trap-days for each type.

The cage traps caught 290 rats and mice of which 262 were combed and 27 of these yielded 47 fleas. Rats and mice in the snap traps numbered 1,420; of these 1,317 were combed and 88 fleas were recovered from 73 rodents. The snap traps caught nearly five times as many rodents as were taken in the cage traps but there was undoubtedly a loss of fleas. The snap traps, however, caught nearly three times as many infested rodents and nearly twice as many fleas were recovered from them, which, in effect, meant a greater number of rodents and fleas over the same period for the same unit of work. For the purposes of the continual type of plague surveillance which is carried on in Hawaii the authors are therefore convinced that snap traps have definite advantages over cage traps. *H. S. Leeson*

CHOLERA

ROGERS, L. **A Tragedy: How Surgeon-Major N. C. Macnamara was deprived of Priority in the Discovery of the Causative Organism of Cholera.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1950, Jan., v. 43, No. 4, 395–400.

Sir Leonard Rogers relates an interesting piece of medical history. Surgeon-Major Macnamara, of the Indian Medical Service, had studied cholera in India for many years and had published two books on the subject. He had seen the occurrence of cholera in persons known to have drunk water recently contaminated with fresh rice-water stool and this, and other observations, had led him to the conclusion that infection was conveyed by water and probably due to an intestinal bacillus. This view was scoffed at officially at the time Macnamara was in India, before the cholera vibrio was discovered, the prevailing view then being that epidemic spread was air-borne.

Macnamara carried out experiments in animals for the purpose of demonstrating the correctness of his view but without success, owing, as we now know, to the insusceptibility of animals to oral infection. In the course of his work he contracted cholera and had to go home preparatory to his retirement in 1876.

Macnamara subsequently took up active surgical work in London and was a member of the Council of the Royal College of Surgeons from 1885 to 1901 and Hunterian Orator on craniology in 1901. He still, however, hoped to be able to verify his hypothesis that cholera was caused by bacteria in contaminated water and, for the purpose, qualified himself to undertake bacteriological investigations at a suitable opportunity by studying bacteriology under Koch in Berlin.

When the disease appeared in Egypt in 1883 Macnamara applied to the Secretary of State for India for facilities to go to Egypt to carry out bacteriological investigations and asked for the assistance of a young highly qualified Indian Medical Service officer. The correspondence which followed the application is presented in the paper. Macnamara represented that the work

would probably not take very long and would not entail any great cost. His application was refused and in the same year Koch with his assistants was sent to Egypt at the expense of the German Government and succeeded in demonstrating the presence of *Vibrio cholerae*, known at first as Koch's comma bacillus.

Macnamara could hardly have failed to discover it if the India Office authorities had given him the facilities for which he had asked : the credit to British workers was lost by their refusal. *John Taylor*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

PIEKARSKI, G. Über den Befall mit Darmparasiten bei Schulkindern und ehemaligen Soldaten. [**The Incidence of Intestinal Parasites among School-Children and former Soldiers.**] *Ztschr. f. Parasitenk.* 1949, Dec. 31, v. 14, No. 4, 377–87. [32 refs.]

This is a *Festschrift* contribution to Professor Rodenwalt on the 70th anniversary of his birthday. It contains no original work but is an estimation of protozoal and helminthic infestation among school-children of Bonn and returned soldiers in the Nauheim hospital, the results being compiled from returns already published, and comparing them with some recorded elsewhere in other parts of Germany. The figures are presented almost entirely in percentages and may be summed up as follows : the war years seem to have made no difference in the protozoal incidence among the school-children ; dysentery carriers of amoebae continue to be 2·5 per cent. and *Giardia intestinalis* 22·5 per cent. The figures among the soldiers are interesting. In 1944 there were 26·4 per cent. with *E. histolytica*, 30·9 with *E. hartmanni*, and only 0·9 per cent. with *G. intestinalis* ; three years later, the respective percentages were 13·5, 33·7 and 6·8, which the author interprets as indicating a tendency for the *histolytica* carriers of the war years to return to the average among the general population, some 7–10 per cent. He is of opinion that *E. histolytica* and *E. hartmanni* are not merely races of one species but are two distinct species.

As regards helminthic infestations, 25 per cent. of the Bonn school-children harboured *Ascaris lumbricoides* and nearly all (99 per cent.) *Enterobius vermicularis*. X-rays are not a satisfactory method of demonstrating *Ascaris* infestation ; less than half (44 per cent.) of children with ova in their stools showed evidence by X-rays. Both *Ascaris* and *Enterobius* infestations can exist without eosinophilia. There is nothing said about helminthic infestation among the Nauheim group. *H. Harold Scott*

BACH, F. W. Untersuchungen in Kriegs-, Friedens- und Nachkriegszeit ueber die Verbreitung parasitischer Darmprotozoen, insbesondere *Entamoeba histolytica*, unter der einheimischen Bevölkerung. [**Incidence of Intestinal Protozoa, especially** *Entamoeba histolytica*, **among the Indigenous Population of Germany.**] *Zent. f. Bakt.* I. Abt. Orig. 1949, Jan. 3, v. 153, Nos. 1/2, 4–8. [11 refs.] English summary (5 lines).

The investigation described in this paper was undertaken with the view to determine whether there had been an increase in the incidence of intestinal protozoal infections (especially *Entamoeba histolytica*) among the German population since the last war. Surveys carried out by the author and his associates in various parts of Germany since 1922, provided figures for

comparison with recent findings in the Saar region. The people examined represented unselected cases belonging to various age groups and occupations, including the inmates and staff of mental hospitals, none of whom showed symptoms of amoebiasis. The results, based on a single examination of the stool for protozoal cysts, are shown in the accompanying table, from which it is seen that the incidence of protozoal infections has increased considerably during and after the war, exceeding 50 per cent. of the cases examined.

In discussing the rise in the incidence of *E. histolytica*, it is noted that it was especially high among [? foreign] workers (groups *f*, *g* in third column) and is comparable to that among the inmates of mental hospitals (group *c*) in peacetime, the increase in both cases being due to unfavourable surroundings [which in the former case presumably included overcrowding and insanitary conditions]. The author then considers the rôle of carriers (especially among food-handlers) in the dissemination of amoebiasis and the question of their treatment. In this respect carriers of *E. histolytica* cannot be compared with carriers of intestinal bacterial infections, for the development of clinical symptoms of amoebiasis depends (1) on the lowering of the host's resistance and (2) on the increase of the parasite's virulence after sojourn in the tissues. Consequently convalescent amoebic carriers are of greater epidemiological importance than contact carriers, to which the cases described by the author belong. In carriers occurring in countries with a temperate climate, the equilibrium established between parasite and host is not so easily upset as in warm countries, where the climate and concomitant bacterial infections tend to lower the host's resistance, as the result of which amoebic dysentery develops. The author therefore believes that in Germany amoebic dysentery is not likely to occur, but the appearance of non-characteristic intestinal disorders cannot be excluded. However, observations carried out by the medical authorities of the U.S. Army of Occupation in 1946–47 have shown that the incidence of infection with *E. histolytica* among the American troops in Germany amounted to 25 per cent., which included some cases of amoebic dysentery said to have been acquired locally, though none of the indigenous population suffered from the disease.

The author concludes that, in view of the high incidence of amoebic carriers in Germany (average 7 per cent.), some of the intestinal disorders among them might be due to *E. histolytica*, though true amoebic dysentery is not likely to develop. He therefore believes that drug treatment of carriers should not be universal but restricted to special cases.

Years	Locality	Number of persons examined	Percentage infected						
			Total	*Entamoeba* histolytica*	*E. coli*	*Endolimax*	*Iodamoeba*	*Chilomastix*	*Giardia*
1922–24	Bonn	(*a*) 435	37·0	3·9+2·1	23·2	7·8	4·8	1·4	14·9
1932 ...	Stade	(*b*) 496	28·0	1·8+1·2	17·9	4·8	1·2	0·2	6·6
1932 ...	Stade	(*c*) 504	39·9	9·5+2·2	25·4	6·3	4·9	0·6	4·4
1932–35	Beuthen	(*d*) 433	18·9	1·4+0·9	7·8	3·7	0·9	—	6·2
1943–44	Saar...	(*e*) 115	16·5	0·9+2·6	8·8	5·0	4·5	3·5	4·5
1943–44	Saar...	(*f*) 151	62·9	7·9+5·3	40·4	4·0	27·7	0·7	18·5
1943–44	Saar...	(*g*) 200	58·5	8·5+4·5	34·0	15·0	22·5	5·5	11·5
1947–48	Saar...	(*h*) 213	50·2	6·6+1·4	38·5	4·7	5·2	3·3	4·2

*The first figure in this column refers to the large race of *E. histolytica*, the second to the small race (=*E. hartmanni*).

C. A. Hoare

NEGHME, A. & SILVA, R. Amebiasis en zonas rurales y sub-urbanas de la Provincia de Santiago. [**Amoebiasis in Rural and Sub-urban Areas in Santiago Province.**] *Bol. Informaciones Parasitarias Chilenas.* 1949, Oct.–Dec., v. 4, No. 4, 51–2.

The English summary appended to the paper is as follows :—

" Investigating the incidence of amoebiasis on several rural and sub-urban zones in the neighborhood of Santiago, the authors found percentages of infection centering around 30%."

SANTOS, J. P. Frequencia das parasitoses intestinais em Copacabana. [**Frequency of Intestinal Parasites in Copacabana.**] *Folha Med.* 1949, Dec. 5, v. 30, No. 23, 186–7.

FULLER, Frances W. & FAUST, E. C. **Aureomycin in the Cultivation of** *Endamoeba histolytica.* *Science.* 1949, Nov. 11, 509–10.

The authors describe tests on the effect of aureomycin on the growth of a human strain of *Entamoeba histolytica* and the accompanying bacterial flora in culture. Powdered aureomycin (Lederle brand) was diluted in a phosphate buffer *p*H 6·9 to produce concentrations in the culture tubes ranging from a dilution of 1 : 1,000 to 1 : 5,000,000. In each experiment the inoculum consisted of centrifuged 48-hour cultures of the amoeba, 0·5 ml. of which were inoculated into each of the culture tubes containing various dilutions of aureomycin. Growth of the amoebae was estimated by microscopical examination through the wall of the test tube, with a 16 mm. objective. The results were compared with control cultures containing streptomycin (10,000 units) and penicillin (5,000 units).

From the three sets of experiments described it is evident that there is an optimum range of aureomycin concentration favouring the growth of *E. histolytica.* Dilutions of less than 1 : 100,000 inhibit the growth of amoebae but check the growth of bacteria, while great dilutions (upwards of 1 : 2,000,000) are insufficient to control bacterial growth. The amoebae grow well at a range from 1 : 300,000 to 1 : 1,000,000, but the growth of bacteria is not inhibited. It is concluded that *E. histolytica* " grows in the aureomycin cultures as well as, if not better than, in the penicillin-streptomycin cultures, although control of bacterial flora was less satisfactory ". *C. A. Hoare*

TOBIE, J. E. **Experimental Infection of the Rabbit with** *Endamoeba histolytica.* *Amer. J. Trop. Med.* 1949, Nov., v. 29, No. 6, 859–70, 8 figs.

Owing to the limited success of previous workers in attempts to produce experimental infections of the rabbit with *Entamoeba histolytica,* the present author has undertaken a study of this problem on a larger scale, using a total of 44 young rabbits, varying in age from 5 to 13 weeks. Prior to and during the experiments the animals were kept on a special grain-bread diet. Examination of their faeces before the inoculations revealed no natural amoebic infections. The strain of *E. histolytica* used was originally isolated at sigmoidoscopy from a patient suffering from amoebic dysentery, and subsequently kept in culture.

In one set of experiments, 33 rabbits were inoculated by means of a syringe into the oesophagus, each receiving about 1 ml. of a concentrated inoculum containing numerous cysts. In another set, 11 rabbits were inoculated intracaecally with from 0·5 to 2 ml. of 48-hour cultures containing trophozoites. In the cyst-fed group, six (18 per cent.) of the animals became infected, while

in the group inoculated with trophozoites amoebiasis was produced in ten (91 per cent.) of the animals. In all these cases only active amoebae were seen, some of them with ingested bacteria or protozoa, others containing red blood corpuscles. Cysts were not observed in any of the infected animals. A detailed description with excellent illustrations is given of the pathology of rabbit amoebiasis. Lesions similar to those in human cases were scattered in varying numbers and sizes throughout the large bowel, but chiefly in the caecal region, while in one animal the small intestine was also involved. In appearance the ulcers were flask- or bottle-shaped. In some cases there was a fulminating infection terminating fatally.

From these experiments it would appear that the rabbit is a suitable experimental animal for immunological and chemotherapeutic studies of amoebiasis. *C. A. Hoare*

CARRERA, G. M. & FAUST, E. C. **Susceptibility of the Guinea Pig to *Endamoeba histolytica* of Human Origin.** *Amer. J. Trop. Med.* 1949, Sept., v. 29, No. 5, 647–67, 11 figs.

The authors record the results of experimental infection of the guineapig with a human strain of *Entamoeba histolytica*. In these experiments a total of 35 animals was used, with six control guineapigs. They were obtained from different sources and were naturally infected with a variety of protozoal and helminth parasites, a full list of which is given.

The strain of *E. histolytica* employed in these experiments was isolated from a human case of amoebiasis in 1947 and has since been maintained in culture. The inoculum varied from 2·5 to 7 cc. of pooled and concentrated cultures 24–48 hours old, containing 200,000 to 7,150,000 amoebae, as determined by counting samples in a haemocytometer chamber. The guineapigs were inoculated after laparotomy by intra-ileal injection near the ileo-caecal junction. They were then sacrificed at scheduled intervals and autopsies were performed immediately afterwards. The entire gut posterior to the point of inoculation, as well as the liver, was examined parasitologically and histologically. Examination of faecal pellets *ante mortem* did not provide sufficient evidence of the course of infection. *E. histolytica* recovered at various levels of the intestine was represented almost exclusively by trophozoites, some of which contained ingested red blood corpuscles. Of the 35 guineapigs, 29 became infected ; in those killed 1–3 days after inoculation, 8 out of 15 revealed amoebae in the intestinal contents, while typical amoebic lesions were present in all of them ; in guineapigs killed after 4–7 days parasites and lesions alike were found in 19 out of 20. In most cases the lesions were restricted to the caecal area, where the amoebae were also most abundant. They were also relatively common in the contents of the terminal ileum and ascending colon, and were occasionally present in the transverse and descending colon, but only on one occasion in the rectum.

The amoebic lesions were of two types : one, a shallow open cup-like ulcer, not extending beyond the muscularis mucosae ; the other, a deep ulcer with a small aperture, extending to and beyond the subserosa. Some of the lesions were characterized by lytic necrosis without bacterial invasion, while in others there was an inflammatory reaction and bacteria were present. Though in a number of infected guineapigs macroscopic lesions of the liver were seen, *E. histolytica* was detected (by liver culture) only in one case. In general, experimental amoebiasis of the guineapig causes loss in weight, anorexia, reduced activity and deterioration of the fur.

From these experiments it is evident that the guineapig is highly susceptible to infection with *E. histolytica*, and can be employed for the study of various

unsolved problems regarding the host-parasite relations in amoebiasis. The paper is illustrated by a number of figures and photomicrographs. *C. A. Hoare*

STEWART, G. T. **Post-Dysenteric Colitis.** *Brit. Med. J.* 1950, Feb. 18, 405–9. [20 refs.]

In Ceylon 50 per cent. of 627 cases of dysenteric disorder seen by the author in European and Asiatic in-patients were due to amoebiasis, and 37 per cent. of them to bacillary dysentery. In numbers of these observed for at least three months after specific treatment the subsequent incidence of diarrhoea among those suffering from bacillary dysenteric infections was negligible, among those with amoebiasis it was high. Twenty-three of 29 cases of amoebiasis in which diarrhoea persisted after treatment were found to have been freed of their amoebic infection, so the diarrhoea was not due to a persisting amoebiasis.

In Liverpool the author saw only a negligible number of cases of bacillary dysentery; but there were 174 cases of active amoebiasis, and 49 cases of post-dysenteric colitis. The previous dysentery was of amoebic origin in 28 of the 49, and bacillary in 12; it was due to a dual infection in 9 of them. The symptoms and signs in these 49 patients are analysed; the main complaints were diarrhoea, lassitude, loss of weight and abdominal pain.

Sigmoidoscopic study enabled the cases of post-dysenteric colitis to be subdivided into two types; in 55 per cent. of them the mucosa was normal in appearance (Type I), and in these the stools though loose contained little or no cellular exudate; in the remaining 45 per cent. there were inflammatory or ulcerative lesions in the colon (Type II). Those in the Type I group suffered from intermittent diarrhoea, rarely severe, and tended to recover spontaneously; but those in the Type II group were seriously and sometimes intractably ill, and passed blood and pus in the stools.

The factors put forward by various authors as being conducive to the production of a post-dysenteric colitis are discussed. In some cases of the ulcerative type it was found that when a non-specific bacterial infection is controlled by antibacterial treatment (sulphathiazole and penicillin) the condition resolved (Type IIa); but in others antibacterial treatment afforded no relief (Type IIb). Cases illustrative of Type I, Type IIa, and Type IIb post-dysenteric colitis are detailed. *A. R. D. Adams*

HUBER, H. Besondere Verlaufsformen der Amöbenerkrankung. [**Amoebiasis with Peculiar Course.**] *Deut. med. Woch.* 1950, Jan. 13, v. 75, No. 2, 71–4.

The author gives notes of five patients. The first was a man of 42 years who contracted dysentery in South Russia in 1942. Three years later he complained of debility, attacks of giddiness, sweating, pain over the heart and later in the shoulders. In 1948 the liver and spleen were both found enlarged, diarrhoea set in and *Entamoeba histolytica* was found in the stools. He was suffering from amoebic hepatitis. Puncture of the liver revealed an abscess from which 500 cc. of pus were evacuated. This was apparently unexpected and the author says that no case of amoebic hepatitis should be regarded as cured until puncture has been carried out.

The second patient was a man of 53 years; he had contracted dysentery in Morocco in 1913. In 1918 he suffered from an obstinate bronchitis, after which he remained in good health for 26 years. In 1944 he began to have severe attacks of asthma for which no treatment seemed to be availing. These continued until a diarrhoea called for examination of the stools and *E. histolytica* was found, and in the sputum *minuta* forms of the protozoon. Combined emetine and yatren brought about cure.

The third case was similar, but the asthma and bronchitis seemed to be concomitant symptoms with amoebic dysentery as no mention is made of the presence of the *Entamoeba* in the sputum. He had contracted the infection in Rotterdam. The fourth was a man of 42 years who had never been away from his own home district [not named] and, therefore, how he had contracted the disease is not known, beyond the fact that during and after the war he had worked with a family of which one son had died of amoebic dysentery and during his illness other members of the family had paid frequent visits to the hospital. *Minuta* forms of *E. histolytica* were found in his stools after repeated examination. Emetine and yatren brought about cure. The fifth patient suffered from a mild chronic amoebiasis [why this is included with cases running a peculiar course is not clear]. *H. Harold Scott*

PIZZI P., T. & CÉSPEDES F., R. Abscesos hepaticos amibianos. Consideraciones anátomo-clínicas. [**Amoebic Liver Abscess.**] *Bol. Informaciones Parasitarias Chilenas.* 1949, July–Sept., v. 4, No. 3, 37–42.

[An instructive account and important for tropical practitioners, and especially those proceeding to the tropics with little or no previous experience of diseases in warm climates.] The authors have examined the records of autopsies at their hospital during the eight years, 1941–48. Among 5,000 autopsies they have found 20 with liver abscess as the cause of death. They attribute the paucity of cases to the improvement in the treatment of amoebiasis, medical and surgical, and state that the 20 were difficult to diagnose or of exceptional gravity. Of the 20, 14 were males and 6 were females ; their ages ranged between 26 and 70 years, most being between 30 and 50 years. In ten the diagnosis had been made before death, in the other ten the diagnoiss had been wrong. Where the diagnosis had been made correctly the conditions were severe ; one patient had had as many as seven abscesses, five in the right lobe, one in the left and one in the Spigelian ; another had four, and a third had " many " all in the right lobe. Death in these cases was due to peritonitis, to perforation, to cerebral amoebic abscess, to tuberculosis, among other causes. In the wrongly diagnosed cases, the diagnoses made included empyema, subphrenic abscess, pleuro-peritoneal tuberculosis, mitral disease, cancer of stomach and cancer of the lung.

In all but two cases, in which nothing is said about the colon, amoebic lesions were present there. About half the patients had no record of dysentery and neither faecal nor signoidoscopic examination had been thought necessary. The author points the moral : " It is probable that search for the parasite in the faeces of patients with diarrhoea would have obviated errors in diagnosis."

H. Harold Scott

BORDES, L. A. Colohépatite amibienne, abcès du foie à bacille de Friedlander. Pyelonephrite residuelle à bacille de Friedlander avec hypertension arterielle. [**Amoebic Colitis and Hepatitis, Liver Abscess due to Friedlander's Bacillus, with Residual Pyelonephritis and Hypertension.**] *Méd. Trop.* Marseilles. 1949., Sept.–Oct., v. 9, No. 5, 805–7.

BALASUBRAHMANYAN, M. & CHERIYAN, O. **A Case of Amoebic Vaginitis.** *Indian Med. Gaz.* 1949, Nov., v. 84, No. 11, 501–2, 1 fig. on pl.

The authors record the case of an Indian girl of 12 with a history of a bloodstained vaginal discharge for six months and of bloodstained loose motions

before that. In fresh specimens of vaginal discharge, trophozoites of *Entamoeba histolytica* were found : no amoebae were found in the stools examined on three occasions.

The condition responded to emetine and local treatment within a week. [See also SEN, this *Bulletin*, 1949, v. 46, 742.] *H. J. O'D. Burke-Gaffney*

PLUCHON, J. & PILLE, G. Dosage de la conessine dans les urines, les fèces et la bile. Résultats obtenus. [**Estimation of Conessine in Urine, Faeces and Bile.**] *Méd. Trop.* Marseilles. 1949, July–Aug., v. 9, No. 4, 519–31, 1 chart. [13 refs.]

A number of reports on the use of conessine in the treatment of amoebiasis have recently appeared in French journals [this *Bulletin*, 1948, v. 45, 905, 1086; 1949, v. 46, 365, 469, 1037]. The object of the present investigation was to determine the length of the period over which the drug continued to be eliminated. An unspecific method of estimation was employed, originally suggested by PRUDHOMME for use with quinine, and a similar principle has recently been applied by BRODIE & UDENFRIEND [this *Bulletin*, 1947, v. 44, 793] for estimation of organic bases in general. The present method of estimation depends on the fact that a complex with conessine and eosin is formed, insoluble in neutral aqueous solutions, but soluble in chloroform to give a red colour stable in the dark over some weeks. By comparison with a standard curve the amount of alkaloid present can be determined. The sensitivity of the method is about 1 in 2 million and 5γ of material in 10 cc. of solution can be measured in the photo-electric colorimeter. In the case of urines the alkaloid was exhaustively extracted with ether and re-extracted into acid solution before estimation. Nicotine and other interfering substances can be eliminated by steam distillation and conessine itself can be separated from antimalarials by the same method. Estimations of conessine in faeces and bile were carried out in a manner similar to that in urine. After a course of 4 gm. of conessine over a period of 10 days it was found that the alkaloid could be detected in urine for 100 days, in faeces for 70 days, but was absent from the bile after a few days. *J. D. Fulton*

NEWTON, W. L. & JONES, Myrna F. **The Effect of Ozone in Water on Cysts of** *Endamoeba histolytica*. *Amer. J. Trop. Med.* 1949, Sept., v. 29, No. 5, 669–81.

The relative ineffectiveness of chlorination as a method of destruction of *Entamoeba histolytica* cysts in water has induced the authors to carry out tests on the cysticidal properties of ozone, which has already proved to be of value as a bactericidal agent in water treatment.

Ozone used in these experiments was obtained by passing oxygen through a 15,000 volt silent discharge, which produced 2–3 per cent. ozone. The mixture of oxygen and ozone was bubbled through a delivery tube into 1–3 litres of water in a 3-litre flask for a period of time required to produce the desired concentration of ozone. Cysts of *E. histolytica* were obtained by subinoculating cultures grown without starch into medium with starch, in which cysts appeared after three days. The cyst-containing sediment in the cultures was pooled, washed, centrifuged and stored overnight at 5°C. Estimation of cyst yields was made by counting 0·05 ml. samples.

The experimental procedure was as follows. After ozonizing the water, the amount of " applied " ozone was determined in a 100 ml. sample. A few ml. of the cyst inoculum were added to provide a concentration of about

40 cysts per ml., the flask was shaken and another sample poured off for determination of the " ozone demand " of the cysts. At the desired interval of time, a sample was poured off for the ozone determination. For the recovery of the cysts 500–750 ml. were poured into a beaker containing sufficient N/100 sodium thiosulphate to stop the action of ozone. The beakers with cysts and water were then left for four to five hours in order to concentrate the cysts, after which the supernatant fluid was removed. Dilution counts were made of the cysts recovered in the sediment and samples containing various numbers were inoculated into culture media with rice starch, together with the flora originally accompanying the strain of amoebae used. For each experiment control cultures of untreated cysts were made. A sample of each culture was examined after 72 hours incubation at 37°C., and, if negative, the culture was subinoculated and re-examined 72 hours later.

The criterion of survival of cysts exposed to ozone was their ability to grow in culture compared with that of untreated controls. In the method which was finally adopted for the estimation of the results with five-minute ozone residuals, both control and treated cysts were inoculated in series of decreasing numbers. Tests with control cysts showed that the presence of an average of 10 cysts per tube would result in a positive culture, while growth expectancies were also obtained with eight and four cysts. On the basis of these figures, estimates of cyst destruction were made with cysts inoculated in numbers varying arithmetically from 2,000 to 125 per culture tube. The results of 15 experiments pointed to from 98 to over 99 per cent. cyst destruction with five-minute ozone residuals of 0·3 ppm. and above, produced by ozone applications of 0·7 ppm. and above. In order to determine the importance of contact time, cyst samples were de-ozonized half, one, three, five and ten minutes after application of from 0·3 to 0·8 ppm. ozone. The results of these experiments were evaluated by inoculating cysts in decreasing numbers varying logarithmically. The results of 18 experiments showed that the maximum (96–99 per cent.) amount of cyst destruction took place after exposure for one minute. It was also found that variations in the experimental conditions (temperature, *p*H, water used, organic nitrogen) had no marked influence on the results obtained. It is concluded that ozone in an aqueous solution is highly cysticidal for *E. histolytica.* *C. A. Hoare*

GAN, K. H. **Amoebae in Rats.** *Documenta Neerlandica et Indonesica de Morbis Tropicis.* Amsterdam. 1949, Dec., v. 1, No. 4, 371–6, 4 figs.

This paper is a slightly expanded English version of a Dutch paper by the same author published elsewhere and reviewed in this *Bulletin*, 1949, v. 46, 941.

YOUNG, M. D. **Attempts to transmit Human** *Balantidium coli*. *Amer. J. Trop. Med.* 1950, Jan., v. 30, No. 1, 71–2.

The attempts were unsuccessful.

RELAPSING FEVER AND OTHER SPIROCHAETOSES

KRAKOWSKY, J. & EDELSTEIN, E. **A Survey of 25 Cases of Tick-borne Relapsing Fever, observed at No. 9 Army Hospital.** *Harefuah.* Tel-Aviv. (Foreign Edition). 1949, Dec., Nos. 5/6, 23–4.

This gives a much fuller English summary of the paper referred to in this *Bulletin*, 1949, v. 46, 835.

EADS, R. B., HENDERSON, H. E., MCGREGOR, T. & IRONS, J. V. **Relapsing Fever in Texas : Distribution of Laboratory Confirmed Cases and the Arthropod Reservoirs.** *Amer. J. Trop. Med.* 1950, Jan., v. 30, No. 1, 73–6, 2 pls.

" In Texas, one hundred cases of relapsing fever were confirmed by demonstration of spirochetes in thick films of the patient's blood, or in blood films of rodents inoculated with a small amount of the patient's blood, during the period June, 1942 through May, 1949. The cases occurred chiefly in the central part of the State, with scattered cases in all but extreme East Texas. During the same period of time, specimens of *Ornithodoros turicata*, have been taken in 44 Counties, representing all sections of the State but East Texas. In all but eight of the Counties, pools of the ticks were shown to contain individuals harboring spirochetes."

LEGERTON, C. W. & CHAMBERS, W. L. **Spontaneous Rupture of the Spleen in Relapsing Fever.** *U.S. Armed Forces Med. J.* 1950, Jan., v. 1, No. 1, 88–90.

The authors discuss the causes and pathology of rupture of the spleen and then record a case in a man of 33 who had been for six months in Korea, where louse-borne relapsing fever occurs.

He had suffered from a febrile condition for three days and complained of a dull ache in the right upper abdominal quadrant. Apart from some bowel looseness and slightly dark urine, no other significant features were recorded at first. There was no jaundice and the liver and spleen were not palpable, but there was slight tenderness on deep palpation in the right upper abdominal quadrant. A provisional diagnosis of the prodromal phase of infectious hepatitis was made.

During the course of the next 24 hours the patient at first felt much better after intravenous fluids : but that night he complained of pain in the left upper abdominal quadrant. Signs of shock appeared and there was an ill-defined abdominal tenderness. A few hours later, he improved on suitable treatment : by this time the spleen was palpable three fingers breadth below the left costal margin and was soft and tender. A friction rub was present. Splenic infarct with possible rupture of the spleen was diagnosed. Despite supportive treatment and the administration of plasma, dyspnoea and shock recurred and the patient died early in the morning. The spleen had not increased in size in the last three hours, but the abdomen seemed to be enlarged and doughy.

Autopsy showed the presence of bloody fluid and some 5000 cc. of recently clotted blood in the peritoneal cavity, mostly in the left upper abdominal quadrant around the spleen. The spleen weighed 315 gm. and was large and soft : there was a rupture of 3 to 6 cm. in width in the anterior midportion. No disease of the spleen was evident, but microscopic examination of this organ and of the enlarged congested liver showed many spirochaetes identified as *Trep. recurrentis*. Many spirochaetes were also found in the peripheral blood.

H. J. O'D. Burke-Gaffney

JELLISON, W. L., ENEBOE, P. L., PARKER, R. R. & HUGHES, L. E. **Rat-Bite Fever in Montana.** *Pub. Health Rep.* Wash. 1949, Dec. 30, v. 64, No. 52, 1661–5.

This is claimed to be the first case of rat-bite fever reported from the Rocky Mountain region of Montana. The resemblance of this disease to Haverhill fever is pointed out. The patient in the present instance was a girl of nine years who was bitten on the finger by a sick mouse at her home farm. A week

later the finger was swollen and painful, but there was no ulceration and in the succeeding nine days the swelling subsided ; macules 0·5 to 2 cm. in diameter extended up the arm to the axilla. A diagnosis of tularaemia was made, but agglutination tests, though repeated, were negative. She was given penicillin and sulphadiazine and, later, streptomycin. Within 24 hours of the last being given, the fever, which had ranged up to 105°F., became normal. After convalescence was established tests were again made with *Br. tularensis* and *Streptobacillus moniliformis*, the cause of Haverhill fever, but were still negative.

Examination was now undertaken with mice and other small rodents at the farm where the patient lived and in the neighbourhood and *Spirillum minus* was found, not in the blood, but in the heart-muscle impression smears of 16 trapped *Mus musculus* at the farm itself and one *Microtus* trapped in a field a quarter of a mile distant. *H. Harold Scott*

LEPROSY

BECHELLI, L. M. A importância das causas predisponentes na epidemiologia da lepra. [**The Importance of Predisposing Causes in the Epidemiology of Leprosy.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Sept., v. 17, No. 3, 175–85. [19 refs.] English summary.

A general discussion and critical review.

DAVISON, A. R. **The Infectivity of Neural Leprosy.** *Internat. J. Leprosy.* New Orleans. 1949, July–Sept., v. 17, No. 3, 247–52.

The author agrees that neural leprosy is much less infective than lepromatous leprosy, but he wishes to refute the argument that neural leprosy presents no public health problem at all. South Africa is the only country that insists on compulsory segregation of all types until cured, although the congresses of 1938 and 1948 did not consider that neural cases required restraint. The author considers the figure in Rogers and Muir's *Leprosy* of 5·3 per cent. infection rate from neural cases to be too low, and quotes higher rates from the literature. Further the lower rate is not negligible, for lepra bacilli can sometimes be found in the nose and skin of neural cases. In two cases superinfection occurred in the absence of demonstrable bacilli. He also holds, contrary to most leprologists, that neural cases not infrequently change to the lepromatous form to the extent of 45·7 per cent. of African females and 37·7 per cent. of African males with 28·0 per cent. of the former and 24·6 per cent. of the latter having positive nasal smears. The totals of those who have either become lepromatous or have shown bacilli are 75·7 per cent. females and 62·3 per cent. males. Furthermore, one-quarter of those discharged as arrested have returned as clinically reactive even if not bacteriologically reactive. He regrets he is not able to show actual evidence of neural cases infecting others. He therefore feels that no precautions whatsoever should be relaxed in our leprosy campaign. *L. Rogers*

ROSS, Hilary. **The Thymol Turbidity and Cephalin-Cholesterol Tests, Euglobulin, Albumin-Globulin Ratio and Serology in Leprosy.** *Internat. J. Leprosy.* New Orleans. 1949, July–Sept., v. 17, No. 3, 237–45. [14 refs.]

This is a highly technical paper which should be read by those interested. The main conclusions are based on tests of blood specimens from 152 cases of leprosy with 10 controls. One or more of the tests were positive in 57·2 per cent., all were positive in 38·8 per cent. and 3·3 per cent. were negative in all

the tests. Positive cephalin-cholesterol flocculation was obtained in 68·4 per cent. and thymol turbidity value was above normal in 61·2 per cent. The albumin-globulin ratio was below normal in 95 per cent. and euglobulins were increased in 104 of the 152 cases. The serological test was positive in 86 per cent. Marked variations were found between the groups into which the cases had been divided, the greater number of positive reactions with all the tests being met with in moderately and far advanced lepromatous cases. It appears that an increase in beta and gamma globulins is a part of the reactions of both tests. The conclusion is reached that the noted changes appear to be the result of a widespread disorder of function of the body tissues involving the reticulo-endothelial system, including the skin and probably certain internal organs.

L. Rogers

SCHUJMAN, S. Estudo comparativo das intradermorreações com a lepromina bacilar comum e a cadavérica em doentes de lepra. [**Comparative Study of Intradermal Reactions in Leprosy Patients with the Common Bacillary Lepromin and that prepared from Autopsy Material.**] *Rev. Brasileira Leprologia.* S. Paulo. 1949, Sept., v. 17, No. 3, 147–50, 5 figs. on 2 pls.

The following is a translation of the author's summary :—

Using the bacillary antigen from autopsy material prepared by Campos, the author made a comparative study of intradermal reactions produced by this antigen in a 1/1000 solution and the common bacillary antigen in a 1/2000 concentration.

The study was made in 170 patients, 120 of whom had lepromatous and 50 tuberculoid leprosy : agreement was found in 96 per cent. of cases.

[See also this *Bulletin*, 1950, v. 47, 247.] *H. J. O'D. Burke-Gaffney*

TISSEUIL, J. Lèpre et filariose cutanée. [**Leprosy and Cutaneous Filariasis.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 11/12, 539.

In 1937 at Bamako, the author examined the skin of 32 leprosy patients who showed manifestations suggesting onchocerciasis. In these, microfilariae of *Onchocerca volvulus* were found in 12 ; in six of them, they were in lesions rich in leprosy bacilli, but the other six were bacteriologically negative. Of the other twenty patients only half had lesions showing *M. leprae.*

The microfilariae did not therefore appear to have any special preference for the infected tissue. *H. J. O'D. Burke-Gaffney*

BOENJAMIN, R. Over de behandeling van het primair affect bij lepra. [**The Treatment of the Primary Lesion of Leprosy.**] *Med. Maandblad.* Batavia. 1949, Dec. 1, v. 2, No. 12, 360–68, 3 figs. on pl. English summary.

The author, from the Central Institute for Leprosy Research in Batavia, describes in clinical detail seven cases of leprosy with single primary skin lesions seen at the Institute between 1937 and 1942. In six of them prolonged exposure could be established.

In one patient, there was an elevated spot of tuberculoid type on the cheek : the others showed flat solitary depigmented maculae, with disturbances of sensation. All nasal secretions were bacteriologically negative. The patients had no subjective complaints, no thickened nerves or enlarged lymph glands. The two types are well illustrated in three photographs.

The lesions were extirpated and in the patient with the elevated spot, tuberculoid changes were found and acid-fast bacilli were present. One other patient also showed tuberculoid changes, but without bacilli. The remaining five

patients showed round-cell infiltration around the blood vessels and no bacilli.

The author refers to the literature and notes that primary lesions are usually smooth maculae with some anaesthesia and are commonly bacteriologically and histologically negative. Perivascular round cell infiltration is observed [see, for example, MANALANG, this *Bulletin*, 1948, v. 45, 611].

On the other hand, a primary lesion taking the form of an elevated spot usually shows leprosy bacilli [see NOLASCO and LARA, this *Bulletin*, 1942, v. 39, 222].

The author's seven patients were observed for three to 12 years after extirpation of their lesions and so far have shown no further manifestations of leprosy.

The author quotes the literature to show that under certain conditions the primary skin lesions in leprosy may remain localized for some time : and he advocates that when a solitary primary lesion without thickened nerves or local adenopathy is seen, excision of the affected skin should be considered in an effort to prevent further development of the infection.

H. J. O'D. Burke-Gaffney

HORAN, J. S. **Treatment of Lepra Reaction and Acute Neuritis and Arthritis with Nerve Block and Intravenous Administration of Procaine. Preliminary Report.** *Internat. J. Leprosy.* New Orleans. 1949, July–Sept., v. 17, No. 3, 211–16.

At Molokai nerve block has been used in the treatment of neuritis, arthritis and lepra reactions with good results. The ulnar and peroneal nerves are most frequently affected, with spastic flexion of the little and ring fingers in the case of the former. The nerve blocks were produced by the injection around the affected nerve of a solution of 0·15 per cent. pontocaine solution, with epinephrine 1 : 200,000, to the amount of 10 to 20 cc., which gives satisfactory anaesthesia for five or six hours and also probably causes relaxation of the fingers and prevents permanent contracture. In most of the cases there was no recurrence for three months and relief of severe pain was immediate. Furthermore, ulcers of the feet respond well to nerve block and may rapidly heal, vasospasm is relieved, the normal circulation is restored and the repetition of the measure postpones contracture indefinitely. Again, 158 intravenous infusions of procaine have been given in 36 patients for complaints varying from lepra reactions to muscle pains with symptomatic relief in the majority of the patients and subsidence of reactions for two or three days ; 1 gm. of procaine in 500 cc. physiological solution, with 2 cc. vitamin B complex was used. Eight of 11 cases of erythema nodosum also responded and deep itch was relieved.

L. Rogers

FRASER, N. D. **Leprosy in the Outpatient Department and Clinics supervised by the Swabue Mission Hospital.** *Internat. J. Leprosy.* New Orleans. 1949, July–Sept., v. 17, No. 3, 265–72.

In China the treatment of even non-contagious cases of leprosy in the outpatient departments of hospitals has not yet been generally accepted by physicians. The use of sulphones has led to increased interest in the subject. Records would be simplified by brief notes in columns of a register to include history of exposure to infection, and laboratory examinations and classification. In 1947 an out-patient clinic for leprosy patients was opened at the Mission hospital and later huts were provided for 20 in-patients. At the end of a year the attendances amounted to 25,000 out-patient visits and various common affections were treated. Two other clinics were opened a few miles away and 93 cases had been registered at the central hospital. A table of a hundred

cases showed 33 lepromatous, 46 tuberculoid and 21 simple neural cases. Chaulmoogra oil preparations were used and a fairly regular weekly attendance of 70 of the 100 patients indicates their consciousness of improvement, which was very marked in early neural and tuberculoid cases, but only slight or insignificant changes occurred in the more recently treated lepromatous ones, in which it is hoped to use sulphetrone shortly. Inquiries are being made for land for a colony. Recent Communist control has not led to interference with the work and the workers have been assured of assistance in developing it. A useful start has thus been made. *L. Rogers*

MOLESWORTH, B. D. & NARAYANASWAMI, P. S. **The Treatment of Lepromatous Leprosy with 4 : 4′-Diaminodiphenyl Sulfone in Oil ; Findings in 100 Cases treated for One Year. With a Note on the Technique of Sulfone Determinations** by I. A. SIMPSON. *Internat. J. Leprosy.* New Orleans. 1949, July–Sept., v. 17, No. 3, 197–210, 20 figs. on 5 pls.

This is a well-illustrated paper showing good effects of injections of the parent nucleus of sulphones, 4 : 4′-diaminodiphenyl sulphone, or DDS in the form of a 20 per cent. suspension in deodorized coconut oil with 0·5 per cent. phenol, which the authors were led to use by favourable reports of a similar trial by COCHRANE, who had, however, met with toxic signs, sometimes serious. Doses given deeply into the subcutis were increased from 1 cc., or 0·2 gm. of the substance, to 5 cc. or 1 gm., weekly in one or two injections with good tolerance. The results of a year's work are now reported, controlled by repeated bacteriological examinations and illustrated by photographs before and after treatment which clearly show very considerable improvement in lepromatous patients about 30 years of age. Blood levels of the preparation have been very constant, with injections twice a week, as is excretion in the urine. In post-mortem tissues of two patients the highest concentrations of the drug were found in the liver, kidney and skin. The results showed clinical improvement, often to a remarkable extent, in 96 of the 100 cases. Bacteriological improvement was noted in 27, a stationary condition in 64 and an increase of bacilli in smears in 9. The greatest proportion of reductions were in the moderately advanced group. Superficial ulcers, even those of long duration, healed rapidly and soundly as did nasopharyngeal ones and lesions of the larynx and of the eye also responded well. Children tolerated the drug extremely well. Lepra reactions became less severe after a time and in many nodular cases softening and breaking down was followed by healing. In pregnancy and tuberculosis patients also did well. Iron and yeast, and occasionally liver preparations, controlled anaemia. Notes of 14 cases are given. There was a great saving in dressings and individual tolerance was much the same as in cases treated with sulphetrone, but at a cost of only 10s. a year against £7 10s. with sulphetrone. A method of sulphone estimations is given in an appendix. *L. Rogers*

LOWE, J. & SMITH, M. **The Chemotherapy of Leprosy in Nigeria, with an Appendix on Glandular Fever and Exfoliative Dermatitis precipitated by Sulfones.** *Internat. J. Leprosy.* New Orleans. 1949, July–Sept., v. 17, No. 3, 181–95.

This paper includes clinical studies on the usual lines by the first author and biochemical ones by the second ; the latter have already been dealt with in this *Bulletin* [1950, v. 47, 372] in greater detail so need not be referred to here. An analysis of 227 cases is made ; this number includes many treated for longer periods by Dr. Davey and continued by Dr. Lowe, the results of which confirm

the observations of a number of earlier workers as to the slow but sure improvement which resulted clinically, but less marked effect in reducing the number of lepra bacilli remaining in the lepromatous lesions. Of greater interest is a preliminary study in nine cases of the oral use of diaminophenyl sulphone, commencing with 0·1 gm. daily and increasing every two weeks through 0·2 to 0·3 gm. per day. As these doses were well borne a trial on 54 patients with a daily dose of 0·3 gm. was commenced and in most cases no toxic effects of consequence had been observed, so the test is being continued, but will take much time to assess. If it should be as successful as the early use of this preparation used in the form of injection by COCHRANE *et al.* [this *Bulletin*, 1949, v. 46, 747], it may prove more convenient for use on a large scale as a much more economical drug than the proprietary diasone and sulphetrone. The chemotherapeutic tests of Smith on the good adsorption of this drug from the bowel and excretion by the kidney led to the adoption of the oral method of administration, the results of which will be awaited with interest. *L. Rogers*

LOWE, J. **Treatment of Leprosy with Diamino-Diphenyl Sulphone by Mouth.** *Lancet.* 1950, Jan. 28, 145–50. [25 refs.]

LANCET. 1950, Jan. 28, 167–8. [16 refs.] **Sulphones in Leprosy and Tuberculosis.**

In this further paper the author first summarizes recent work on the treatment of leprosy by sulphones, with which readers of this *Bulletin* are already familiar. He then deals with the work recorded in the above abstract but brings it up to date at the end of one year's experience of the oral administration of diaminodiphenyl sulphone based on the biochemical work of his co-worker, M. SMITH, who showed that this preparation is completely absorbed from the bowel when given orally and can maintain a good blood level when so administered [this *Bulletin*, 1950, v. 47, 372]. The 54 cases previously reported on have now been treated by the oral method for nearly a year with promising results. Thus, no serious toxic effects have been met with in 90 cases now under treatment and in no case have the severe toxic effects reported by COCHRANE [*ibid*, 1949, v. 46, 747] after the intravenous use of the drug been observed, although the earlier doses of up to 300 mgm. daily have in some cases been pushed up to 500 mgm. In 88 patients treated up to one year the results were as follows. In 50 lepromatous cases treated for over six months, 72 per cent. show clinical and 62 per cent. bacteriological improvement, although only three have become bacteriologically negative. In 15 tuberculoid cases, improvement began in one month with complete subsidence of skin activity within six months, but nerve involvement takes longer to subside. The yearly cost was only 14s. per case, twenty times less than with other sulphones. These results, taken with those of MOLESWORTH and NARAYANASWAMI above, are very promising. *L. Rogers*

WINTER, P. D. **South African Leprosy Laws and Control Policy.** *Internat. J. Leprosy.* New Orleans. 1949, July–Sept., v. 17, No. 3, 253–60.

South Africa and the U.S.A. are stated to be about the only countries with a material number of leprosy cases which can afford to segregate compulsorily the little infective nerve types as well as the lepromatous ones, so the consideration of results of their experience in this paper are of interest and importance. The leprosy problem was not dealt with in the Public Health Act of 1919, so it is governed by a series of provincial Ordinances some dating back to 1884, which require consolidation. The disease is of very low communicability in countries with advanced sanitation and the number of cases in Europeans has

fallen greatly in South Africa. In highly infected and backward countries it is only possible to segregate " open " cases and non-infectious neural ones are treated at dispensaries. Morally the onus is to prove a patient to be dangerous before using compulsion to isolate him. The South African Act of 1884 only empowers the isolation of those " likely to cause infection," as does the Natal Act of 1890. It is generally agreed that leprosy is less infective than tuberculosis and this is borne out by the rarity of staff infections in leprosaria. Closed tubercular infections of joints and glands do not need isolation. The difficulty, however, arises through negative nerve cases being liable to become positive, although only in a minority of cases, of which figures are quoted, but half the worst neural cases never become infectious. Furthermore, 87 per cent. of the better class nerve cases passed through an average stay of 2·6 years without ever being sources of available bacilli and during the last three years of 533 neural admissions only 8 (1·5 per cent.) proved positive in nose and skin smears on admission. Surveillance every six months of those discharged as negative is carried out in S. Africa and the provision of a medical inspector is suggested. Active search would raise the incidence of readily curable early cases. Sanatorium treatment under experts is advised and patients in the early stages should be trained in the principles of infection control ; compulsory segregation kept in the background as a valuable weapon in leprosy control. If leprosy were controlled as is tuberculosis it would still be safely managed. The relaxation of permanent segregation in 1923 was beneficial. The disease is now reported to be on the decrease in South Africa. *L. Rogers*

CUBA. **Memoria del V Congreso Internacional de la Lepra celebrado en la Habana, Cuba del 3 al 11 de abril de 1948.**

This book is reviewed on p. 509.

HELMINTHIASIS

NEWSOME, J. **Cinemicrophotography of Helminths and other Semi-Opaque Subjects, using Dark Ground Illumination.** *J. Roy. Egyptian Med. Ass.* 1949, Nov.–Dec., v. 32, Nos. 11/12, 935–9, 1 fig.

OMER-COOPER, J. **Does Destruction of Water Insects cause Increase of Trematode Disease ?** Reprinted from *Entomologist's Monthly Mag.* 1949, June 27, v. 85, 157–9.

This article contains a warning to those who indiscriminately destroy the insect life of fresh waters by the use of DDT, oil and other noxious substances. When on a visit to Zululand to obtain data from the experiment of killing tsetse flies by means of aeroplane spraying with smokes and sprays of DDT, the author noticed the complete absence of insect life, such as beetles, mayfly and dragonfly nymphs, in many of the pools in the game reserve which had been sprayed from the air, but these contained surprisingly large numbers of aquatic mollusca. Conversely, in waters well supplied with insect life, there was no excess of snails. The inference that the increase in the numbers of snails is due to the destruction of their natural enemies, such as birds and insects, seems to be well founded and it is suggested that this might well lead to an increase in the incidence of trematode infections, not only in birds and animals, but also in man, in regions where bilharziasis is prevalent.

J. J. C. Buckley

SIRRY, A. **Radiological Study of Bilharzial Cor Pulmonale.** *J. Roy. Egyptian Med. Ass.* 1948, Feb., v. 31, No. 2, 146–77, 14 figs. [12 refs.]

This number of the *Journal* is directed to chest conditions and to tuberculous infection. The present article records six cases of bilharzial cor pulmonale found in 2,642 admissions to a medical unit in Alexandria over a period of eight months. These six patients had all suffered from mixed *Schistosoma haematobium* and *S. mansoni* infestations for some years. In all there was enlargement of the liver and spleen, and clinical and radiological evidence of enlargement of the pulmonary artery and conus ; both the right ventricle and the right auricle were enlarged in every case, but although there were hilar shadows the lung fields elsewhere showed no constant radiological changes suggestive of bilharziasis. In these six cases the left cupola of the diaphragm was higher than normal and restricted in movement ; the ascending aorta was normal in position and size. The radiological differentiation of other conditions in Egypt which commonly produce cor pulmonale—mitral stenosis, extensive lung disease and congenital cardiac defect—are discussed, and the point is made that in cor pulmonale due to bilharzial infection the size and position of the ascending aorta is normal. *A. R. D. Adams*

HERNÁNDEZ MORALES, F., SANTIAGO STEVENSON, D., OLIVER GONZÁLEZ, J. & MALDONADO, J. F. **An Evaluation of the Therapeutic Effectiveness of Fuadin and Anthiomaline in the Treatment of Manson's Schistosomiasis.** *Puerto Rico J. Pub. Health & Trop. Med.* 1949, Dec., v. 25, No. 2, 256–60. [Spanish version 261–6.]

For many years Fouadin has been used in Porto Rico for the treatment of Manson's schistosomiasis ; it has proved efficacious in about 60 per cent. of cases, as judged by subsequent re-examination of stools with the acid-ether concentration technique. As this method of examination involves the destruction of the contained miracidia it cannot be said whether the ova recovered by it are viable or not ; the complete absence of ova from the stools does not exclude the presence of non-egg laying female and of male worms. Repeated rectal biopsy, practised by the authors since 1945, affords a better means of recovering eggs after treatment and so of revealing the presence of parturient female worms after treatment.

Youths rejected for U.S. Army Service on account of rectal bilharziasis, although showing no evidence of advanced visceral lesions, were treated with Fouadin (115 patients) or with anthiomaline (58 patients). The dosage of the former compound was 5 ml. (42·5 mgm. of trivalent antimony) every 48 hours to a total usually of 50 ml. ; experience early showed that the usual initial graduation of the dosage was unnecessary. The dosage of the latter compound was 3 ml. (30 mgm. of trivalent antimony) every 48 hours to a total of 45 ml., in the majority of cases ; six patients received injections every 24 hours to a lesser total dosage, but although this proved more therapeutically effective it tended in some cases to increase the toxic effect of the drug. Although both in those treated with Fouadin and those treated with anthiomaline there was an inexplicable increase in egg counts during the first few days of treatment, by the tenth day eggs had disappeared from the stools of all the patients. The periods of observation after treatment ranged from 5 months to 26 months in most cases, and for as much as 10 years in a few of those treated with Fouadin. The percentage of cures after Fouadin treatment, as judged by the continued absence of viable ova from biopsy specimens and stools, was 78·3 per cent., and that after anthiomaline treatment 71·82 per cent. *A. R. D. Adams*

LANG, K., SIEBERT, G. & LÖNNECKE, W. Ueber biochemische Wirkungen von Miracil D. [**The Biochemical Action of Miracil D.**] *Klin. Woch.* 1950, Feb. 1, v. 28, Nos. 5/6, 104–5.

MAO, C. P., LI, L. & WU, C. C. **Studies on the Emergence of Cercariae of** *Schistosoma japonicum* **from their Chinese Snail Host,** *Oncomelania hupensis*. *Amer. J. Trop. Med.* 1949, Nov., v. 29, No. 6, 937–44, 2 figs. [13 refs.]

"1. Light plays an important role in the emergence of *Schistosoma japonicum* cercariae from their Chinese snail host, *Oncomelania hupensis*.

"2. Temperature plays a less important role since in our experience no quantitative difference was observed between 15° and 35°C. Shedding from some snails occurred at 5°C. but the number of cercariae shed was small.

"3. Water with pH values ranging from 6·6 to 7·8 seemed equally suitable for the shedding of *S. japonicum* cercariae.

"4. Tap water and filtered river water were both suitable for shedding of the cercariae but distilled water was unfavorable.

"5. Infected snails kept moist showed a greater readiness to shed cercariae than those kept dry."

MOORMANN, H. Die Leberegelkrankheit (Fasciolosis) beim Menschen. Eine klinische Betrachtung mit kasuistischem Beitrag (Beobachtung einer Fasciolosis bei einem Kinde). [**Liver Fluke Disease** (*Fascioliasis*) **of Man : Report of a Case in a Child and Discussion.**] *Med. Klin.* 1950, Jan. 6, v. 45, No. 1, 4–8. [34 refs.]

The author gives a detailed account of the examination of the daughter of an agricultural worker, aged 6, whose infection with *Fasciola hepatica* was not detected until after her death. Two striking features of the case were enlargement of the liver and an eosinophilia of 31 per cent., which increased to 39 per cent. and then sank slowly to 3 per cent. Skin and complement fixation tests with *Echinococcus* antigen were negative and no helminth eggs of any kind were found in the stools, so that infections with other tapeworms or with *Ascaris lumbricoides* were regarded as being improbable. Other possible diagnoses are discussed.

The autopsy revealed cholangitis with numerous abscesses in both lobes of the liver, a condition which had been clinically suspected. In the gall-bladder and also in the extra- and intrahepatic bile ducts 25 adult *Fasciola hepatica* were found. "Enteritis-Bakterien Gärtner," previously detected in watery stools passed by the living patient, were recovered from the gall-bladder and bile duct. The autopsy also showed slight inflammation and enlargement of the spleen and the intra-abdominal lymph nodes, ascites, a right-sided hydrothorax with adhesions of the diaphragm with the liver, dilated ventricles and hyperaemia and oedema of the lung. The parents and four sisters were healthy, but whipworm eggs (*Trichuris trichiura*) were found in the stools of the mother and eggs of *Enterobius* in those of one sister. Sheep, among which three had died of fascioliasis, grazed in the damp pastures adjoining the child's home.

The rest of this paper describes the life history of *Fasciola hepatica* and the symptoms, diagnosis, prophylaxis and therapy of human infections with this species of fluke. *G. Lapage*

TALICE, R. V. & GURRI, J. Desarrollo de *Cysticercus racemosus* y su relación con el grado de malignidad de la cisticercosis correspondiente. [**Development of *Cysticercus racemosus* and the Degree of Malignity resulting therefrom.**] *An. Facul. de Med. Montevideo.* 1949, v. 34, Nos. 8/9, 827–40, 24 figs. [17 refs.]

This is an account of the growth of *Cysticercus racemosus* from the histological aspect. [*Cysticercus racemosus* is the name given to forms of Cysticercus which grow in an irregular form in such tissues as the brain where pressure is not exerted regularly upon them and growth is free.] The material was obtained at an operation for cerebral cysticercosis carried out in Uruguay. The patient was a man of 53 years in whom a cerebral tumour of benign nature involving the frontal region was diagnosed in 1948 when an exploratory operation was performed in July. As the symptoms persisted another operation was undertaken in October and the tissue removed.

The development of *C. racemosus* is on the same lines as that of *C. cellulosae* and the histology of the cyst is similar. The histological characters and the changes are well shown in a series of photomicrographs. From the clinical point of view the danger arises from the localization of the cyst and, during the growth, from degenerative changes in the pedicle resulting in enlargement of the cavity, together with the development of fresh vesicles and budding. As this, if left alone, is limitless, it is an urgent necessity that extirpation should be undertaken early and that it should be total and complete.

H. Harold Scott

TALICE, R. V. & GURRI, J. Sobre la morfologia de *Cysticercus racemosus.* Existencia de un revestimiento ciliado en su pared. [**On the Morphology of *Cysticercus racemosus.***] *An. Facul. de Med. Montevideo.* 1949, v. 34, Nos. 8/9, 841–4, 3 figs.

The authors describe and depict the histological structure of the wall of a cyst removed from the brain of a man with *Cysticercus racemosus.* The tissue was fixed in 10 per cent. formol and mounted in paraffin ; sections of 8μ thickness were cut and stained with haematoxylin and eosin.

On both the internal and external aspects is a row of cilia on a basal layer which readily separates from the subjacent tissue ; the cilia are about 3μ long. The authors state that similar cilia may be demonstrated on *Echinococcus* scolices.

H. Harold Scott

LENTZE, F. Askaridose und Oxyuriasis, ein aktuelles Gesundheitsproblem. [**Ascariasis and Enterobiasis—an Actual Health Problem.**] *Ztschr. f. Sozialhyg.* 1949, Oct., v. 1, No. 1, 9–12. [11 refs.]

The author discusses :—

(1) The epidemiology and control of ascariasis. In towns with drainage *Ascaris* is not widely distributed, but the use of human faeces as manure transmits its eggs to fruit and vegetables which are infective when they are eaten raw. The author quotes an incidence of *Ascaris* of 1·2 per cent. of people in a modern town with drainage and houses with small gardens and an incidence of 64 per cent. in a comparable town without drainage. Among a group of families who used stable manure on their gardens no *Ascaris* were found, while, among 120 families which used human manure on their gardens, 63 had *Ascaris.* Medical practitioners should consider the possibility of *Ascaris* infections ; laboratory examinations of stools should be done as often as possible and,

when positive cases are found, all members of that family should be examined. Family infection indicates a source of infection in the garden of the infected family.

2) The control of enterobiasis, which has, since the war, become a scourge of the German people. The author remarks that a people whose soap-factories and dwelling houses are in ruins will never get rid of this parasite and he asks for a better supply of soap and removal of the present housing shortage.

G. Lapage

DE CARVALHO, J. D. Avaliação da intensidade da ancilostomose no Município de Antonina. [**Estimation of the Intensity of Ankylostomiasis in Antonina Municipality, Paraná.**] *Hospital*. Rio de Janeiro. 1949, Nov., v. 36, No. 5, 739–55, 10 graphs.

Two groups of persons in this municipality have been examined: 448 of 6,195 town-dwellers (7·2 per cent.) and 1,090 of 7,203 in rural districts (15·1 per cent.). Apparently the method used was direct examination of the faeces. Of the total 1,538, there were 1,202 (78·1 per cent.) positive. Dividing these into their respective groups: 277 of the 448 town-dwellers were positive (61·8) and 925 of the 1,090 rural inhabitants (84·9). The percentages varied considerably between the groups according to age; thus below 6 years the figures were 28·1 for urban and 71·0 for rural dwellers; between the ages of 7 and 14 years, 70·8 and 85·7 respectively; from 14 to 45 years, 65·3 and 90·3, and over 46 years 66·7 and 86·5 per cent. On the whole the degree of infestation was not high; in the rural zones the heavily infested were only 18·6 per cent. of the positive and 11 per cent. were classed as "very heavily infested; in the urban zones the corresponding figures were 9 and 8·7. As regards sex, in the towns there was little difference, but in rural areas males were more affected than females and in the former the degree of infestation was higher. White persons on the whole showed a greater incidence, 79·9 to 71·3 per cent. among the coloured; in the rural districts this preponderance of whites held good, 85·4 and 78·9 respectively, but in the towns they were reversed, 55·3 and 68·3 per cent. The author lays some stress on these figures, but of those examined whites were nearly twice as many as the coloured. Further, among the coloured, those with "light and very light infestation" exceeded proportionately these grades among the whites, but of those heavily infested whites exceeded the coloured.

H. Harold Scott

MASQUELIER, J. & BAILENGER, J. Rôle des bactéries dans l'apparition des propriétés hémolytiques des extraits d'*Ascaris*. [**Rôle of Bacteria in the Appearance of Haemolytic Properties in Extracts of** *Ascaris*.] *C.R. Soc. Biol.* 1949, Sept., v. 143, Nos. 17/18, 1188–9.

PAUTRIZEL and BAILENGER showed that haemolytic properties identified in extracts of *Ascaris* by different workers appeared to be due to bacteria of the *Proteus* group naturally contaminating the extracts [this *Bulletin*, 1949, v. 46, 653].

Chemical studies by the present authors (under publication) indicated that these haemolytic properties were due to a lipid rich in non-saturated fatty acids. In the present work, they investigated the question of whether the bacteria actively secrete this substance or, alternatively, confine themselves to liberating a non-haemolytic complex normally present in the ascarid extracts.

They prepared, aseptically, aqueous extracts of fresh, washed *Ascaris*. After confirming the absence of haemolytic properties, they divided the extracts into three equal fractions. The first was incubated at 37°C., the second was

kept in the refrigerator as a control and the third was autoclaved at 120°C. for 15 minutes. The first fraction alone acquired the power to haemolyse red cells after intense bacterial proliferation. The bacteria isolated did not, however, acquire haemolytic properties unless they were cultivated on (human) blood agar: they were evidently incapable by themselves of secreting a haemolytic substance.

Blood-agar plates were then prepared, incorporating 1/10th their volume of the third fraction. The bacteria from *Ascaris* cultivated on these media proved to be haemolytic. Nevertheless identical properties were found in other bacteria, especially *Staph. aureus*. Apparently helminthic tissue was necessary for the phenomenon to occur.

The authors offer alternative explanations for the part played by the bacteria. Firstly, the ascarid extracts may contain a substance capable of modifying the bacterial action, which stimulates secretion of haemolytic properties not ordinarily present (as is provoked by nicotinamide in certain bacteria). In this case the haemolytic substance would be specifically bacterial in origin. Alternatively, there may be a non-haemolytic complex in the body of the *Ascaris*: the action of bacterial enzymes on this complex may result in liberation of a specifically ascarid haemolytic substance. The authors favour the second hypothesis: experimentally, by substituting bacterial action with the proteolytic effect of papain they were able to reproduce the same phenomenon, suggesting that the bacteria acted by means of their proteases. The lipid haemolytic substance in the *Ascaris* should therefore be found in the form of an inactive lipido-protein complex.

As to the part played by the bacterial lipases, the authors state that the lipids liberated by papain were a little less rich in fatty acid and slightly less haemolytic than those liberated by the bacteria. This may be explained by the secondary action of a bacterial lipase, though this lipase action is not essential because the authors have obtained strongly haemolytic substances after the action of bacteria not secreting lipase. *H. J. O'D. Burke-Gaffney*

Deschiens, R., Bablet, J. & Lambault, E. Les lésions anatomo-pathologiques de l'intoxication aiguë par les extraits d'ascaris. [**The Anatomo-Pathological Lesions in Acute Intoxication from *Ascaris* Extracts.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 11/12, 554–6, 4 figs. on 2 pls.

The following is a translation of the authors' summary :—

The lesions in acute intoxication by the toxic products of *Ascaris* are of an oedematous, haemorrhagic and hyperplastic type; they are associated with dilatation of the veins and capillaries of the principal organs: especially the lung presents an acute serous or haemorrhagic generalized oedema or a diffuse alveolitis according to the degree of intoxication and the species of animal used. Death from acute pulmonary oedema is the rule in guineapigs.

H. J. O'D. Burke-Gaffney

Breuer, H. Über einen Fall schwerer toxischer Gesamtschädigung durch Ascariden nebst Vorschlägen zur allgemeinen Bekämpfung der Wurmplage. [**A Case of Serious Toxic State due to *Ascaris* Infestation in a General Anthelmintic Campaign.**] *Med. Klin.* 1950, Feb. 10, v. 45, No. 6, 173–4.

The patient, a boy of 8 years, was brought to the author in a state of unconsciousness, ill and emaciated. The father gave a history of the child having passed round worms by mouth and in the stools and having had the preceding day a severe nose-bleeding. The child was restless, very pallid with

slight icteric tint of skin and sclera ; respirations deep and slow, pupils dilated, sluggish in reaction ; the nose was filled with clotted blood ; deep reflexes lively, pulse small and weak, 96 per minute ; liver enlarged to two finger-breadths below the costal margin, spleen not enlarged ; marked albuminuria, no glycosuria ; blood showed red cells 2,385,000, white 15,200 per cmm., haemoglobin 58 per cent., eosinophiles 16 per cent. An enema resulted in the passage of 6 *Ascaris*. In view of the circulatory weakness strophanthin was given. The next day consciousness returned for a short time ; cardiac stimulants had to be repeated. The urine, drawn off by catheter, was albuminous (1·5 per cent. Esbach). Santonin was given but was retained with difficulty and 40 worms were expelled ; during the next two days the general state varied, with repeated collapse and mental dullness, but worms were passed with each motion. During the succeeding four days there was increased tachycardia and fibrillation. After passage of more than 200 worms the child's condition improved, the pulse rate was 120 per minute, the kidney condition and the anaemia cleared up. The author adds that in the whole of Germany helminthiasis is rife and there is need for extensive campaign against infestation. *H. Harold Scott*

LARSH, J. E., Jr. **Relationship in Mice of Intestinal Emptying Time and Natural Resistance to Pig Ascaris Infection.** *Science.* 1950, Jan. 20, 62–3.

See also p. 472, TISSEUIL, **Lèpre et filariose cutanée.**

See also p. 497, PERRY, **The Mosquitoes and Mosquito-borne Diseases of the Treasury Islands (British Solomon Islands).**

BENITEZ CALVO, L. A. Notas sobre el tratamiento medico de la filariosis. [**Treatment of Filariasis by Drugs.**] *Med. Colonial.* Madrid. 1950, Jan. 1, v. 15, No. 1, 33–9.

After quoting many drugs which have been used for *Wuchereria bancrofti* and *Loa loa* infections with varying but on the whole uncertain results, the author speaks of the clinical success which he has obtained, particularly in loiasis, by means of neostibosan injections in doses of 0·05 gm. for adults to a total of 0·3 gm. in two or three courses. For *W. bancrofti* infections he adds his meed of praise to Hetrazan, given orally in doses of 0·2 to 2·0 mgm. per kilogramme body weight thrice daily. The higher doses may cause aggravation of symptoms, increase in the size of the elephantoid swellings, regarded by the author as allergic in origin. Such are not seen when the dose does not exceed 0·5 mgm. per kilo. In the author's experience no untoward symptoms have followed the giving of 25 mgm. thrice daily with antihistaminics. *H. Harold Scott*

BERTRAM, D. S. **Studies on the Transmission of Cotton Rat Filariasis. I. The Variability of the Intensities of Infection in the Individuals of the Vector, *Liponyssus bacoti*, its causation and its bearing on the Problem of Quantitative Transmission.** *Ann. Trop. Med. & Parasit.* 1949, Dec., v. 43, Nos. 3/4, 313–32, 4 figs. [25 refs.]

The author presents a substantial, quantitative study on the infection of the mite *Liponyssus* by *Litomosoides*, a filarial parasite of the cotton rat.

Unexpectedly low rates of infection in mites, and some irregularity in infecting cotton rats, have been reported by several authors : the method has generally been to put an infected rat in a nest among large numbers of mites, and then replace it by another rat, so maintaining the chain of infection. The author

wishes to produce more predictable and quantitative results; his general method is to put an infected rat with a certain number of mites over a pan of water, from which the mites are collected as they drop off gorged: or a rat may be infected if a known number of mites (of which the rate of infection is known by dissection) is liberated on it.

Using such methods as these, Bertram obtained an infection rate of 56 per cent. among 2,600 mites dissected. He studied the frequency distribution of worms among mites, finding that a single worm is more common than any larger number. In batches in which the infection-rate is high, there is a tendency for a large number of worms to occur in some individual mites. Even when the number of worms is high there is little evidence that they kill the mite. It is evident that the number of worms which establish themselves in the mite may be much below those enumerated in the venous blood of the rat: apparently the feeding mechanism allows the mite, in some way, to take up blood without swallowing the corresponding number of larval worms.

The author does not think it probable that there is any genetic resistance to infection in the mites. *P. A. Buxton*

TASQUÉ, M. Essais de traitement de 17 cas de filariose à *Loa-loa* par le 3,799 RP. [**Therapeutic Trials of 3,799 RP (Hetrazan) in 17 Cases of Filariasis due to** *Loa loa*.] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 11/12, 556–7.

The 17 patients treated (in Berbérati, French Equatorial Africa) were male adults (including 14 Africans, and 1 European); 10 had clinical symptoms and the other 7 were asymptomatic carriers of microfilariae. The compound was given by mouth for 7 to 11 days in doses of 3–6 mgm. per kgm., the dose on the first day being less than 3 mgm. Microfilariae disappeared from the blood in 4–8 days. Some of the patients suffered an exacerbation of their clinical symptoms and of pruritus during the first 48 hours of treatment. Two patients complained of lumbar pains and violent headache, and broke off the treatment. In the other patients, the preliminary effects were good but they could be followed only for 5–12 weeks, and it is not known whether they relapsed.

F. Hawking

PUIG SOLANES, M. Gonioscopia en los enfermos oncocercosos. [**Gonioscopy in Onchocerca Patients.**] *Gac. Méd. de México.* 1948, Dec. 31, v. 78, Nos. 5/6, 302–16, 5 figs.

Goniometry is measurement of angles and gonioscopy in the present article means examination of the angles of the anterior chamber of the eye, or the pathology of the anterior parts of the eye in onchocerciasis. The lesions described are of interest chiefly to the ophthalmological specialist. The author records in a number of tables the results of the examination of the eyes of 15 *Onchocerca* patients; 12 were males and 3 were females; one was under 10 years of age, 7 between 11 and 20 years, 3 in the third decade, one in the forth, two in the fifth; of one the age was not known. The duration of the disease was less than one year in one case, between 1 and 5 years in four, between 6 and 10 in five, and over 10 in three; two were unknown. Fourteen had, or had had, nodules, and biopsy examination was positive in 13, negative in one, not carried out in one.

Of the 30 eyes examined, 10 showed conjunctival lesions and 16 corneal lesions, marginal in 4, disseminated in 8 and conglomerate in 4. Twelve had incipient iritis, 13 a mild irido-cyclitis (contracted irregular pupil and posterior synechiae, but good vision) and 5 had severe irido-cyclitis with extensive synechiae, pupillary occlusion, etc. The cornea-iris angle was normal in 21,

slightly altered with ciliary synechiae in 2, and more marked changes, disseminated trabecular synechiae and corneal synechiae in 7. Changes in the angle of the anterior chamber depended on the degree of the lesions of the iris ; in the early incipient stages, the angle was normal ; in the second stage, that of mild irido-cyclitis, it was mostly normal ; of 13 eyes in this stage, in 9 the angle was normal, two had slight lesions, ciliary synechiae, and two had more severe corneal synechiae. Of 5 in the third stage all showed marked angle changes. Other tables present these facts subdivided in other ways ; the author concludes that the method is useful in elucidating the pathogeny of the condition ; that occlusion of the angle is due to oedema of the ciliary body and the root of the iris which occurs in exacerbations from time to time in the generally slow course of onchocercal irido-cyclitis. Characteristic of the change is early involvement of the posterior mesodermic layer of the iris with partial disappearance of the regularity of the pupillary margin, entropion of the edge of the pupil and the deviation at the lower part of the pupil due to retractile tissue of the posterior chamber. These changes occur before the posterior synechiae are observed, but the early involvement of the posterior layer is the reason why mydriatics do not result in dilating the pupil.

H. Harold Scott

PUYUELO, R. Note préliminaire sur l'épidémiologie et le traitement de l'onchocercose humaine à *O. volvulus*, en pays Mossi. Le 3799 R.P. (Notézine). [**Preliminary Note on the Epidemiology and Treatment of Human Onchocerciasis due to *O. volvulus* in the Mossi Country. Compound 3799 RP., Notezine, or Hetrazan.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 11/12, 558–61.

The Mossi district is near the Upper Volta. Onchocerciasis is endemic. In 1949, 88,289 Africans were examined, 8,172 carried filarial cysts, 2,066 were blind, and this was assumed to be due to *Onchocerca*, while 621 showed various ocular manifestations (keratitis punctiformis, iritis, etc.). Caravans of blind persons, holding sticks end to end were encountered ; and in one village 7·6 per cent. of the population of 1,564 people were sightless. In another region, 20 per cent. of the population have been reported as being infected and it is probable that a systematic search for microfilariae would raise this figure to 60 or 80 per cent. Surgical treatment was carried out by two surgical teams who systematically excised all nodules in order to prevent the onset of ocular lesions. Chemotherapeutic treatment by hetrazan was given to 50 patients in 3 courses, each of 10 days, with intervals of 10 days. On the first day 100 mgm. base were given ; on the second, 200 mgm. ; on the third 300 mgm. ; on the fourth 200+200 mgm. The first results showed that in 3 patients, microfilariae disappeared in 3 days, in one after 16 days, and in one after 34 days. Amelioration of vision occurred in two patients. Unfortunately hetrazan causes allergic reactions, (ameliorated by phenergen, antistine, etc.) and it is necessary to be prudent in treating ocular onchocerciasis. It is proposed to publish the final results of all the 50 cases. *F. Hawking*

ENGLER, G. & SANCHEZ, G. *Capillaria hepatica* (**Bancroft, 1893**). **A Case Report.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1950, Jan., v. 43, No. 4, 443–4.

The authors refer to previous records of infection with *Capillaria hepatica*, and note that the number of cases, now over 30, were probably spurious infections acquired from ingestion of the liver of certain infected animals. They

also refer to the probable sources of infection in Panama [see this *Bulletin*, 1948, v. 45, 1023].

Their present case is that of a Panamanian woman of 19, who suffered from fever and cough for 2 days: the sputum was streaked with blood. Examinations were largely negative, except that the stools showed the presence of *Necator americanus*, *Trichuris trichiura* and ova of *Capillaria hepatica*. The first two parasites, alone or together, were found in the stools of 4 out of 5 members of the patient's family, but *C. hepatica* was not.

Six consecutive stool specimens from the patient were positive for *C. hepatica* and the identity of the parasite was confirmed at the Gorgas Memorial Laboratory.

Average doses of chenopodium failed to eliminate the parasite, but standard doses of hexylresorcinol cleared the infection.

The patient's father was an occasional hunter in the vicinity of Almirante and during the previous 12 months he had brought home wild hog, tipesquinty, deer, wild turkey and mountain hen. The liver of these animals was fried in sesame oil and allegedly never eaten raw. *H. J. O'D. Burke-Gaffney*

LEICK, G. Die Häufigkeit des Vorkommens von Oxyuris vermicularis. [**The Frequency of the Occurrence of** *Enterobius vermicularis*.] *Deut. med. Woch.* 1949, Dec. 9, v. 74, No. 49, 1507–10, 1 chart.

The author discusses some of the literature on the incidence of *Enterobius vermicularis* and on its life history and embryology. He gives no references and most of the papers discussed are German. He himself studied chiefly the incidence of enterobiasis in men and women, its relation to the occupation of the patient and the incidence during each month of the year. He examined human bodies undergoing post-mortem examinations. The lower part of the small intestine and the caecum and appendix were repeatedly flushed with running water and the flushings were examined for *Enterobius*. If numerous *Enterobius* were found, the upper part of the small intestine was also washed out. The appendix of some cases was examined by means of sections, but few *Enterobius* were found in this organ.

Most of the 1,000 cases thus examined came from Greifswald or its near neighbourhood, but a few were from other parts of Germany. *Enterobius* was found in 41·3 per cent. of the 1,000 cases. Of the 472 males 160 (33·9 per cent.) were infected; of the 318 females 130 (40·9 per cent.) and of the 210 children 123 (58·6 per cent.). A table, which summarizes the results in 5-year age-groups up to the age of 90, shows that children aged 2–5 were the most heavily infected, the incidence among them being 76·2 per cent. among female children and 85·7 per cent. among male children. After this age the incidence decreased. *Enterobius* was not found in children "a few weeks old" and the author concluded that children under 1 year are not infected, although GRIBBOHM (no ref.) states he has found *Enterobius* in children aged 5 and 21 weeks old. A higher incidence was found in women than in men and the author ascribes this to the women's more frequent contact with children. *Enterobius* was found in 1 man and 1 woman aged 90.

A study of the relation of the incidence of *Enterobius* to the occupation of the infected person showed the following percentage incidences: school children 50·9, maidservants 44·4, town workers 42, people of independent means 40, agricultural workers and peasants 38·5 and officials and employees 35·8. The author suggests that maidservants show a high incidence because of their contacts with children. The high incidence found among town workers contravenes the customary view that the incidence of worm-infections, and especially infection with *Enterobius*, is higher among country people than among

townsfolk, but the difference in incidence of *Enterobius* in these two groups is small. Most of the people of independent means were over 50 years of age but the results show that *Enterobius* is not confined to the poorer sections of the population. In relation to the time of the year, the author found a maximum incidence during November, December and January and a minimum from April to June. He discusses this, but is unable to explain it. He does not support the view that summer diarrhoea or other diarrhoeal diseases expel the worms, because in cases suffering from these diseases he found *Enterobius* " in the same percentage " as in other cases. *G. Lapage*

BECKERS, H. Diagnose und Therapie der Oxyuriasis bei geschlossenen Gruppen von Kindern. [**Diagnosis and Treatment of Enterobiasis.**] *Ztschr. f. Hyg. u. Infektionskr.* 1949, Dec. 8, v. 130, No. 4, 361–83. [Numerous refs.]

The term " diagnosis " hardly covers the meaning in this case. It is not so much the actual diagnosis as the prevalence of the infection by *Enterobius vermicularis* among over 200 children from 6 to 15 years of age at two schools at Bonn, examined by Schüffner's anal strip method and subsequent staining by fluorochrome acridine orange. Examination by fluorescent light enables distinction to be made between viable and dead ova.

Among these children 98·6 per cent. were found infested. At a home for children of pre-school age, at which 25 were examined, 20 were found infested and at another of school-age children, all of 29 examined were positive.

Various treatments were tried : Cupronate was given to 55 children, but was quite ineffectual and none was cured. Forty-nine were given Lubisan [this is not defined] in a 3-day course, but only 4 were cured. Thirty-one were given the drug *per os* and at the same time *Unguentum cinereum per anum*, in a strength of 10 per cent., and a wash-out of " antiox ", a basic subacetate of aluminium. After a 5-day course, 10 of the 31 were apparently cured. [The author does not say for how long these patients were kept under observation for testing the permanency of the cure.] *H. Harold Scott*

SCHNEIDER, H. H. Hexachlorcyclohexan (HCC) als Oxyurenmittel. [**Hexachlorcyclohexane (HCC) in the Treatment of Enterobiasis.**] *Klin. Woch.* 1950, Feb. 1, v. 28, Nos. 5/6, 104.

Little is said concerning the actual treatment of infestation by *Enterobius vermicularis* ; this short contribution deals very largely with the mode of action of the drug, HCC [benzene hexachloride, BHC]. Investigations into this have yielded conflicting results, so the author has reconsidered the whole question and tested the mixture of isomers and the pure gamma-fraction in parallel experiments. On insects [not specified] the latter proved 10–50 times as potent as the former. He next tested its action on worms (*Regenwurm*, earthworm) and found it lethal in a strength of 5 mgm. per cent., but on *Ascaris suis* no real harm seemed to follow as much as 50 mgm. per cent. in 48 hours. Further experiments on the former showed that on isolated strips of muscle 5 mgm. per cent. first increased the muscle tone, then enhanced peristaltic action and, later, caused paralysis. On leech preparations, 1 mgm. per cent. produced these effects if the ganglionic chain was intact, but if the ganglia had been removed, 4 mgm. per cent. was necessary. Moreover, there was no difference between the mixed isomers and the pure gamma-fraction. The *chief* point of attack would thus seem to be the central nervous system

(chain of ganglia), though it also acts on the muscle itself. Preliminary treatment with nicotine weakened the action on the nerves, but left that on the muscle itself intact.

The toxicity of HCC was next tried by giving it to rats *per os* in different vehicles, castor oil, cod liver oil, paraffin, and suspended in water. Fats such as cod liver oil " raised somewhat " the toxicity ; castor oil did not, but the gamma-fraction in cod liver oil gained five- to ten-fold toxicity and acted more rapidly.

When tried in infestations by *Enterobius vermicularis* (other helminthiases will be studied and reported upon later) it should be followed by a dose of castor oil. The makers recommend 2 dragées thrice daily for 6 days, each containing 0·02–0·04 gm. of HCC, so the daily dose would be 0·12–0·24 gm. and the course 0·72 to 1·44 gm. In addition it may be given as a suppository, morning and evening, each containing 0·05 gm. The author, however, thinks that alternate-day treatment is better, because, if given daily, it may cause side-effects owing to accumulation. *H. Harold Scott*

SPRUE

MILANÉS, F., HERNÁNDEZ BEGUERIE, R. & LÓPEZ TOCA, R. Contribución sobre el estudio clinicorradiologico del intestino delgado en el sprue tropical. Con referencia al tratamiento por el ácido fólico. [**Study of Cases of Sprue, clinically and radiologically, with regard to their Treatment by Folic Acid.**] *Prensa Méd. Argentina.* 1949, Dec. 23, v. 36, No. 51, 2696–704, 5 figs. [19 refs.]

This is, in the main, a study of X-ray pictures of the small intestine in 20 patients with sprue after oral administration of a barium meal, before and after treatment by folic acid. From the description they seem to have been typical cases, all the cardinal symptoms being present—stomatitis, dyspepsia, characteristic diarrhoea and stools, progressive asthenia and loss of weight. The barium meal was taken fasting, 100 gm. of the sulphate in 150 cc. of water ; radiograms were taken 15 and 45 minutes afterwards and then every hour until the barium arrived at the caecum, and thereafter each hour to observe the colon.

The authors describe the conditions as existing in three grades. In the first the intestinal motility is normal or very slightly reduced. In the second the motility is slowed and the opaque column is broken, indicating loops dilated by atony. In the third, the retardation is marked and the barium takes some 6 hours to reach the caecum, and the column is broken into irregular fragments and clumps.

Of the 20 patients, 14 showed conditions of stage 2, and 6 of stage 3, none of stage 1. Folic acid was given in doses averaging 20 mgm. for varying periods, from a minimum of 3 months to a maximum of a year. The results of the X-ray observations, with which the paper is almost entirely occupied, may be summed up by saying that, as the patients improved clinically so the X-ray findings improved to a certain degree, but never to normal, and they, therefore, are of some assistance in assessing the results of treatment, but " the improvement is not to be regarded as absolute or permanent." [The procedure would, thus, seem to be of very limited value.] *H. Harold Scott*

HAEMATOLOGY

East African Med. J. 1949, Dec., v. 26, No. 12, 399. **Iron Deficiency Anaemia** [Lehmann, H.]. (Proceedings of a Mulago Staff Clinical Meeting, 13th August, 1949.)

The author summarized his work on anaemia in Kampala [this *Bulletin*, 1949, v. 46, 664, 966 ; 1950, v. 47, 269] and in support of the findings already reported, quoted the results of a study of anaemia in Indians there. The Indians were free from hookworms, but had a high iron-deficiency anaemia of dietetic origin. There was pronounced microcytosis, but individual cells were well filled with haemoglobin.

These results were in marked contrast to those found in the case of the anaemic Africans already referred to. In those cases, hookworm infestation had caused a constant drain of blood. Most of the new cells produced by the bone marrow were lost before they had completed their physiological life : there was a raised reticulocyte count, red cells were young, large and undersaturated with haemoglobin. The "precoctic" picture [*ibid.*, 1949, v. 46, 966] produced was sufficiently explained by blood loss from hookworms, since the diet was adequate in blood-forming matter.

The differences between the varieties of iron-deficiency in the two communities in Kampala are well illustrated in the author's table which is reproduced below :—

	African	Indian
Haemoglobin %	Often under 50	Usually over 50
Red cell count	Very low...	Little below normal
Cell size	1/3 microcytic	Usually microcytic
M.C.H.C.	Often under 25% ...	Usually over 25%
M.C.H.	Low, due to low M.C.H.C.	Low, due to low M.C.V.
Serum colour	Pale	Normal
Reticulocytes	Raised	Low
Incidence	Sporadic	General
Recovery	On iron plus wormings...	On iron alone
Cause	Hookworm	Low dietary iron

H. J. O'D. Burke-Gaffney

Prouty, Margaret. **Familial Erythroblastic (Cooley's) Anemia in an American Indian Infant.** *Amer. J. Dis. Children.* 1950, Jan., v. 79, No. 1, 99–104. [Refs. in footnotes.]

"A case of familial erythroblastic anemia (Mediterranean disease ; Cooley's anemia) in a male American Indian infant 2¾ months of age is presented. It is of especial interest because it is believed to be the first case of this condition reported in a person of this race and also because of the early age at which the condition became apparent."

Pratt-Thomas, H. R. & Switzer, P. K. **Cyst of the Spleen in Sickle Cell Anemia.** *Arch. Pathology.* 1950, Feb., v. 49, No. 2, 159–62, 1 fig.

"A large solitary cyst of the spleen of a patient with sickle cell anemia is described. It is believed that the cyst is directly related to the sickle cell anemia and that massive infarction with immediate or subsequent hemorrhage is the background for the evolution of the cyst. This is the one hundred and

sixty-fifth case of false cyst of the spleen to be reported and is the first instance in which such a condition has been described as a complication of sickle cell anemia."

VENOMS AND ANTIVENENES

CREWE, W. & GORDON, R. M. **The Histology of the Lesions caused by the Sting of the Hive-Bee** (*Apis mellifica*). *Ann. Trop. Med. & Parasit.* 1949, Dec., v. 43, Nos. 3/4, 341–4, 4 figs. on pl. [24 refs.]

The authors have demonstrated previously [this *Bulletin*, 1949, v. 46, 514] that bites by blood-sucking flies do not of themselves give rise to the histological changes associated with inflammation and they now set out to describe the local histological effects of stings by *Apis mellifica*. Accordingly, they subjected a special area of the thighs of guineapigs to the sting of the bee and killed the animals with chloroform in 1, 24 and 48 hours afterwards, and excised the skin and underlying muscle for histological examination. The changes are clearly depicted in 4 photomicrographs. In tissue removed 1 hour after the stinging, at the tip of the sting are signs of inflammation, oedema and some cellular infiltration without involving the muscle fibres, but higher up, midway along the course, there is in addition some degree of muscle-fibre necrosis. This is interpreted as indicating that "most of the poison had been injected during the act of forcing the sting through the tissues." [This is very probable, but no mention is made of the fact that probably the greater effort is made by the bee in attempting to extract its sting, for in so doing the sting practically eviscerates the insect.] After 24 hours there is more necrosis of muscle with cytolysis and, at the periphery, chiefly mononuclear cells and some fibroblasts; after another 24 hours a more marked degree of these changes is seen, the necrotic area is more defined, the surrounding infiltration denser and many eosinophiles are present.

Bee venom is believed to contain histamine and injury to the cells probably leads to liberation of more histamine from the tissues. The difference between the changes mentioned and those resulting from bites by blood-sucking flies is stated thus in the words of the authors:

"A combined study of these sections [of tissues of animals subjected to biting insects] presented a histological picture of an uncomplicated haemorrhage beneath the skin, such as might be produced by the repeated probings of a fine sharp instrument. It was further shown that the haemorrhage was absorbed during the next few days, and that this absorption was accompanied by the usual process of cellular invasion, consisting mainly of histiocytes, but that at no time was there any evidence of inflammation." *H. Harold Scott*

DEL POZO, E. C. Mecanismo de las acciones del veneno de alacrán. [**Mode of Action of Scorpion Venom.**] *Gac. Méd. de México.* 1948, Dec. 31, v. 78, Nos. 5/6, 387–97, 7 figs. on 6 pls. [26 refs.]

This is a composite paper, with many references, on the action of scorpion venom—*Centruroides* is the only genus referred to—on the respiratory system of the cat, on its vasomotor system and on striated muscle. Graphs are reproduced from previous publications; they show that a primary increase in amplitude of respirations gives place to phases of apnoea increasing in length,

with muscular fibrillation. On the cardio-vascular apparatus the result is an increase in the blood-pressure from 20 to 140 mm. Hg. On the muscles, fibrillar and fascicular contractions are set up, slight at first, but increasing in amplitude till strong clonic contractions appear due to direct action on the spinal motor neurones. *H. Harold Scott*

DERMATOLOGY AND FUNGUS DISEASES

MACKINNON, J. E., FERRADA-URZÚA, L. V. & MONTEMAYOR, L. *Madurella grisea* **n. sp. A New Species of Fungus producing the Black Variety of Maduromycosis in South America.** *Mycopathologia.* The Hague. 1949, Aug. 30, v. 4, No. 4, 384–93, 6 figs. on pl. [31 refs.]

The nomenclature of the fungi which cause mycetoma with black grains is not satisfactory and there can be little doubt that several of the names should be relegated to synonymy. Difficulty is caused by the inadequate descriptions of some of the species. The original description of *Madurella mycetomi* (Laveran 1902) Brumpt 1905, was based only on the characters of the fungus as seen in the parasitic " grain ", and this description might apply equally to other named species. Subsequent descriptions of cultures from mycetoma with black grains have increased the confusion, and the present authors consider that the combination *Madurella mycetomi* should be rejected as a *nomen dubium.*

In the present work, twelve cultures from the black type of mycetoma were studied, and these comprised *Madurella americana, M. ikedae, Glenospora clapieri, Monosporium sclerotiale,* three strains of *Phialophora jeanselmei* and 5 strains of a South American species for which the authors propose the name *Madurella grisea.* The cultures were studied in relation to their macroscopic and microscopic morphology, the optimal temperature for vegetation and their capacity to utilize various substances as sources of essential carbon and nitrogen (the auxanographic test), to digest certain proteins and to hydrolyse starch. From the results of these tests it was clear that the 5 South American strains were of a single type which was distinct from all the others examined. The general characters of this type, for which the authors propose the name *Madurella grisea,* are as follows : The colonies on glucose agar are hard, creased and folded, almost black in colour covered with a grayish-white pubescence. Colonies are brownish in age but never yellowish and the medium in the neighbourhood of the colony is coloured brown. In Czapek's liquid medium puff-ball colonies are formed with dark centres and a dark growth develops on the surface of the medium. The hyphae are either cylindrical, measuring 2 to 3 μ in diameter, or moniliform and thicker ; 3 to 4 μ. They are fuliginous, branched and septate and give rise to more slender, almost colourless aerial hyphae. Intercalary and terminal chlamydospores measuring from 4 to 7 μ by 3 to 4 μ were rare and not found in all strains. The following sugars could be utilized as sources of carbon : glucose, maltose, galactose and sucrose but not lactose. Essential nitrogen could be obtained from peptone, asparagine, urea, sodium and potassium nitrate and ammonium sulphate. Weak and slow proteolysis of gelatin, milk and coagulated serum occurred and starch was hydrolysed. Good vegetation occurred at 37°C., but the optimal temperature for growth was 30°C.

The species is named *Madurella grisea* Mackinnon, Ferrada & Montemayor, n. sp. and the Latin diagnosis is given. *J. T. Duncan*

EMMONS, C. W., MORLAN, H. B. & HILL, E. L. **Histoplasmosis in Rats and Skunks in Georgia.** *Pub. Health Rep.* Wash. 1949, Nov. 11, v. 64, No. 45, 1423–30, 4 figs.

In an earlier report, EMMONS, BELL & OLSON [this *Bulletin*, 1948, v. 45, 207] described the natural infection by *Histoplasma capsulatum* of rats (*Rattus norvegicus*) and a mouse (*Mus musculus*) in an area in Loudoun County, Virginia. Subsequent investigations brought the total number of infected rats identified in that area to 27. The present study was made on rats and other animals collected in four counties in the southern part of Georgia, primarily in connexion with the survey of typhus fever. The animals were brought to the laboratory alive and, after the relevant data had been recorded, they were anaesthetized and bled to obtain serum for *Histoplasma* antibody tests. Small pieces of the liver and spleen were smeared on slopes of 2 per cent. glucose agar, which were then incubated at room temperature or at 30°C.

In all, 1,391 animals were examined, including the brown rat (*R. norvegicus*) 459, the roof rat (*R. rattus*) 855, the spotted skunk (*Spilogale putorius*) 6, and 71 other animals comprising house mice, cotton rats, cotton mice, a grey fox, a fox squirrel, a fox, a weasel, an opposum and a raccoon. *Histoplasma capsulatum* was isolated from 16 animals: 7 brown rats, 4 roof rats and 5 of the 6 skunks. The strains were all alike and were typical *Histoplasma capsulatum* but they differed in a minor morphological character from the strains isolated from rats in Virginia. The complement fixation test performed on the sera of 286 rats including 7 infected animals gave a negative result in every case. The rôle of the rat in the epidemiology of histoplasmosis is undetermined, but the present study provides useful data on the geographical distribution of the infection, especially as the clinically manifested disease in man is rare. No case of histoplasmosis in man has been recorded from Georgia.

J. T. Duncan

HAUSMAN, R. & HIEMSTRA, S. Een geval van tuberculose en histoplasmose. [**A Case of Tuberculosis and Histoplasmosis.**] *Med. Maandblad.* Batavia. 1949, Dec. 1, v. 2, No. 12, 369–72, 2 figs. on pl.

The English summary appended to the paper is as follows :—

" A 35 year old Chinese dental technician, residing in Java for the past 20 years was admitted to the hospital complaining of pain in his throat. Illness started one and a half years previously with slowly healing ulcers of the face and shoulder regions.

" Biopsy of the epiglottis showed subepithelial granulomatous foci with numerous Langhans giant cells. These were filled with small encapsulated gram-negative organisms in great numbers, morphologically like *Histoplasma capsulatum*. Re-examination of biopsies of the ulcers taken 18 months previously disclosed the organisms in very small numbers.

" Patient was anaemic with an enlarged spleen. X-rays of the lungs showed hilar and right apical involvement and as the illness progressed sputum repeatedly contained many acid fast bacilli. Peripheral lymph glands were slightly enlarged.

" His condition deteriorated rapidly. Death followed in three months. Autopsy was refused.

" This is the third case of histoplasmosis in Indonesia."

ARTAGAVEYTIA-ALLENDE, R. C. Estudio de algunas propiedades biológicas de varias cepas de *Coccidioides immitis* Stiles, 1896. [**Study of certain Biological Properties of various Strains of *Coccidioides immitis* Stiles, 1896.**] *Mycopathologia*. The Hague. 1949, Aug. 30, v. 4, No. 4, 375–8, 2 figs. on pl. English summary.

Three strains of *Coccidioides immitis* from Bolivia, from the United States and from a collection in Paris respectively, and a fungus named *Trichosporon proteolyticum* by Negroni & Villafañe-Lastra in 1939, were studied and compared in their macroscopic and microscopic morphology on various culture media, their ability, as shown by the auxanographic test, to utilize various substances as sources of essential nitrogen or carbon, their proteolytic action on milk, coagulated serum and gelatin (25 per cent.), their action on starch and the result of the catalase test.

In their macroscopic and microscopic morphology all four strains fell into the same group. The nitrogen auxanogram with urea, potassium nitrate, ammonium sulphate, peptone and asparagin showed that all of these substances could be utilized but potassium nitrate supported a poorer growth than the others. In the carbon auxanogram, glucose, lactose, saccharose, maltose and galactose were employed and all were utilized, but glucose more than any of the others. In the tests of proteolysis, positive results were obtained on milk and gelatin but not on coagulated serum, starch was not inverted and the catalase test gave a positive result. The results stated applied equally to all four strains and no difference of any kind was detected between them. It is pointed out that *T. proteolyticum* was reported by Negroni and Radice to be similar to *Pseudococcidioides mazzai* and de Almeida considers this name to be merely a synonym of *Coccidioides immitis*. *J. T. Duncan*

LOONEY, J. M. & STEIN, T. **Coccidioidomycosis. The Hazard involved in Diagnostic Procedures, with Report of a Case.** *New England J. of Med.* 1950, Jan. 19, v. 242, No. 3, 77–82, 6 figs. [11 refs.]

Coccidioidomycosis, a disease endemic in the south-western part of the United States and certain arid regions in South America, is becoming also a disease of the laboratory. The authors refer to 36 cases of laboratory infection by *Coccidioides immitis*, one of which was fatal, and no doubt there were many other subclinical infections which have not been detected. *C. immitis*, in culture, produces an abundance of spores which, when the culture is old, form a light, easily dispersed powder on the surface of the growth. The air disturbance caused by lifting the cover off a Petri plate culture of the fungus may be sufficient to disperse into the air a visible cloud of highly infective spores. Under natural conditions spores of the fungus may be carried long distances in the wind-borne desert dust and infect men or animals which inhale them. In an institution in the United States, persons working two floors above a mycological laboratory were infected by spores apparently released in the laboratory. For this reason, plate cultures or indeed cultures of *C. immitis* on any solid medium are forbidden in that laboratory and in many other American laboratories.

In the case reported by the authors, the patient, a Negro laboratory technician who had never visited an endemic area of coccidioidomycosis, unwittingly exposed himself to infection by examining, with a hand lens, some old, unlabelled, cultures of *C. immitis*. A detailed clinical history of the case is given, for coccidioidomycosis was not suspected until the fungus was isolated in culture from the sputum. The disease, which was still in the primary stage when diagnosed, passed without intermission to the disseminated granuloma stage, an

event which occurs about ten times more frequently in the coloured than in the white race. Radiography showed definite enlargement of the upper mediastinum and of the hilar lymph nodes with infiltration of the lung parenchyma especially in the lower lobes and involvement, with abscess-formation, of some of the bones of the metacarpus and metatarsus. The blood leucocyte count was 21,600 per cmm. with 7 per cent. to 16 per cent. of eosinophils. Unfavourable prognostic signs indicating dissemination of the disease were a relatively low titre coccidioidin skin sensitivity reaction, serum precipitin reaction to an end titre of only 1 : 40 at the first test and a negative result with all subsequent tests, while the complement-fixation reaction was strong at a titre of 1 : 64 and only declined later when the clinical condition showed improvement.

Treatment by administration of large doses of penicillin, aureomycin, and promizole was wholly ineffective and the authors agree that there is no specific treatment of the disease. Rest and symptomatic treatment brought about clinical improvement and some relief was given by radiotherapy applied to the bone lesions. *J. T. Duncan*

COHEN, R. & BURNIP, R. **Miliary Coccidioidomycosis of the Lungs. Report of a Case in a Child.** *Ann. Western Med. & Surgery.* 1949, Dec., v. 3, No. 12, 413–14, 2 figs.

"1. A case of miliary coccidioidal infection of the lungs in a 7 year old Negro child is reported. The patient died 56 days after the onset of symptoms.

"2. The initial symptoms were due to a coccidioidal lesion in the lumbar area which simulated Pott's disease. Material aspirated from this area yielded a pure culture of Coccidioides immitis. Blood culture, complement-fixation and precipitin tests were also positive.

"3. This case demonstrates that coccidioidal infection can mimic tuberculosis in many of its manifestations."

ARTAGAVEYTIA-ALLENDE, R. C. & MONTEMAYOR, L. Estudio comparativo de varias cepas de *Paracoccidioides brasiliensis* y especies afines. [**Comparative Study of various Strains of** *Paracoccidioides brasiliensis* **and related Species.**] *Mycopathologia.* The Hague. 1949, Aug. 8, v. 4, No. 4, 356–66, 11 figs. on 2 pls. (facing p. 374). English summary.

The authors made a comparative study of 12 fungal cultures according to the method employed by ARTAGAVEYTIA-ALLENDE in his study of strains of *Coccidioides immitis* [above]. The strains comprised 5 of typical *Paracoccidioides brasiliensis* from various South American sources, 2 of *P. cerebriformis*, one of which was the type strain named by Moore, 4 of *Blastomyces dermatitidis* from the United States, and a strain of *Glenosporella loboi* Fonseca & Area Leão 1940, from a disease described by da Fonseca under the name of Lobo's disease.

Morphologically, by macroscopic and microscopic examination, the cultures fell into three groups ; the first included all the typical strains of *P. brasiliensis* and the single strain of *Glenosporella loboi*, the second comprised the two strains of *P. cerebriformis* and the third the four strains of *S. dermatitidis*. The carbon and nitrogen auxanograms and the proteolytic, starch inversion and catalase tests confirmed the morphological grouping except in the case of one strain *P. cerebriformis* which fell into the *P. brasiliensis* group and was, therefore, considered to be merely a glabrous variant of *P. brasiliensis*. From these results it was evident that *P. brasiliensis* can sharply be distinguished from *B. dermatitidis*, morphologically and biologically ; *Glenosporella loboi* is, in fact, *P. brasiliensis* and Lobo's disease merely a form of South American blastomycosis. The type of *P. cerebriformis* named by Moore appeared to be

unique. It stood out sharply from all other cultures in the auxanographic tests and, in contrast to *P. brasiliensis*, it had a low optimal temperature for vegetation (25°C.) and it was not pathogenic for the guineapig even when inoculated into the testis. *J. T. Duncan*

LACAZ, C. da S., IARIA, S. T., FERREIRA, Maria, MARTINS, A. A. & VEGA, V. S. Blastomicose experimental. (Nota preliminar). [**Experimental Blastomycosis. Preliminary Note.**] *Hospital.* Rio de Janeiro. 1949, Sept., v. 36, No. 3, 341–9, 2 figs. [17 refs.] English summary.

Tests for pathogenicity of *Paracoccidioides brasiliensis* are usually made by intratesticular inoculation on the guineapig, but, although the resulting disease is not always localized, this kind of infection is not considered suitable for experimental work on the therapy of antibiotics *in vivo*.

Following a report by ROSENTHAL and ROUTIEN [this *Bulletin*, 1947, v. 44, 460] on infection of the guineapig by intratracheal instillation of pus from a lesion of coccidioidomycosis, the present authors conducted a similar experiment with pus from a case of South American blastomycosis and succeeded in causing a pulmonary infection in 1 out of 6 guineapigs. This result is regarded as evidence of the contagiousness of South American blastomycosis. A description is given of the histopathology of the pulmonary lesions in the animal, which shows, as in coccidioidomycosis, the dual response of the leucocytes and the reticulo-endothelial cells.

Using yeast-form cultures of a recently isolated strain of *P. brasiliensis*, the authors inoculated two groups of 9 mice each, one group receiving 0·25 ml. of a suspension of living culture into the peritoneum and the other group a similar dose intravenously. In the group inoculated intraperitoneally, death, often due to some extraneous cause, occurred from 5 to 54 days after inoculation. Only 3 of the 9 animals were found to have lesions of blastomycosis and these were chiefly miliary nodules in the lungs. In the group inoculated intravenously, although the animals survived for 6 to 52 days, nearly all showed disseminated disease with granulomatous nodules containing the fungus chiefly in the lungs, liver, spleen and lymph nodes.

In view of the relatively long survival and the generalized character of the disease following intravenous inoculation with *P. brasiliensis*, mice were considered to be suitable for experimental studies on the chemotherapy of South American blastomycosis. *J. T. Duncan*

MACKINNON, J. E. **The Dependence on the Weather of the Incidency of Sporotrichosis.** *Mycopathologia.* The Hague. 1949, Aug. 30, v. 4, No. 4, 367–74, 7 figs.

The author considers that certain climatic conditions of temperature and humidity, which favour the saprophytic vegetation of *Sporotrichum schencki*, may be determining factors in the epidemiology of sporotrichosis. He points out that the conditions of humidity and temperature which existed underground in the Witwatersrand mines during the recent unique outbreak of 2,441 cases of sporotrichosis [*Bulletin of Hygiene*, 1948, v. 23, 410] may be found on the surface in Uruguay during certain seasons, and he shows also that in the United States, where groups of cases of sporotrichosis have occurred, the disease is found in the humid river valley areas and never in the arid areas where coccidioidomycosis is found.

In Uruguay, sporotrichosis is contracted most frequently during the months of April to July inclusive and in these months there is usually high atmospheric humidity (98 to 100 per cent. of saturation), general surface moisture and a

temperature favourable to the vegetation of *S. schencki*. Thirty-two cases of sporotrichosis were identified in Uruguay between 1929 and 1948 and 26 of these were contracted in April, May, June or July, and only 6 in other months. In 1944, nine infections occurred during the 17 days from May 21 to June 7, and no other cases during that year. In 1947 six cases were recorded and in five of these the infection was contracted during the first week of April. Climatic conditions during the significant periods were, atmospheric humidity reaching saturation and a mean temperature of 16°C. to 20°C. (60·8° to 68°F.) during the last 10 days of May 1944, and an atmospheric humidity of 80 per cent. saturation with a mean temperature from 17°C. to 19°C. (62·6° to 66·2°F.) during the first week of April 1947. *J. T. Duncan*

MISCELLANEOUS DISEASES

JELLIFFE, D. B. **The Syndrome of Onyalai.** *J. Trop. Med. & Hyg.* 1950, Jan., v. 53, No. 1, 9–11.

The author has performed a valuable service in publishing from Nigeria a case which closely resembled the onyalai syndrome and so raising the question as to what is this peculiar bleeding disorder of Africa.

The patient was an African female aged about 18 years admitted to the Ibadan Hospital on 20th June 1949, because of bleeding from the mouth of 5 days' duration. Within the oral cavity were numerous distinct bullae filled with coagulated blood. The gums were swollen, and there was a continuous ooze of blood from them and the bullae. Petechial spots were scattered all over the body surface. Careful blood investigations failed to reveal anything of note beyond the normocytic anaemia which progressively increased. The bleeding and clotting times, the platelet and white cell counts were normal in all respects. The capillary resistance test was positive.

She was given ascorbic acid treatment, with no apparent response. The bleeding gradually ceased over several days and the patient was discharged from hospital at her own request.

A recurrence of the bleeding took place and she sought readmission 17 days later (21st July 1949). By now she had become profoundly anaemic. In addition she was bleeding from the vagina. A few petechiae were observed on the body, but no bullae were present in the mouth. The platelet count was 300,000 per cmm. A sternal puncture was performed, but the marrow picture revealed little of note, the reaction being normoblastic with megakaryocytes in normal numbers.

Vitamin C, followed by vitamin K therapy failed to effect erythropoiesis. She died on 25th September 1949.

The author excluded the various blood dyscrasias including leukaemia. There was nothing in the history to suggest that a native drug or poison was administered. Scurvy and hypothrombinaemia were excluded on clinical and therapeutic grounds.

[The reviewer, who is familiar with onyalai in Rhodesia, has encountered, not infrequently, in the African severe bleeding from the gums and other regions of the body due to severe renal failure from chronic glomerulonephritis ; this was described by WRIGHT of Nairobi in the *East African Med. J.*, 1944, v. 21, 146. It is within the bounds of possibility that uraemia could produce this picture.]

The author may be correct when he states " It is suggested that onyalai may, in fact, be a clinical syndrome and not a distinct disease and that the onyalai bullae may occur as non-specific lesions in various haemorrhagic diseases in Africans." *M. Gelfand*

LAL, S. B. **Lathyrism in Bihar.** *Indian Med. Gaz.* 1949, Oct., v. 84, No. 10, 468–72. [19 refs.]

The author reports on an investigation of three outbreaks of lathyrism in Bihar ; in Patna and Monghyr, flat country on the south of the river Ganges where the outbreak started in July 1947, and Darbhanga, to the north of the river, in August of the same year. All those attacked were " landless labourers ", that is, persons working in the fields and paid by wages in kind—the cheapest grains available. *Lathyrus sativus*, locally *khesari*, grows well, needs little attention, is cheap and serves for cattle as well as for man and was the chief pulse consumed at the time. Two hundred and nineteen persons were affected and all but 8 were males ; most were in Patna (143 cases, 138 males) ; in Monghyr only 27 were attacked, all were males ; in Darbhanga 49, of whom 46 were males. Vitamin A intake was low.

In most of the patients the onset was sudden ; a " weakness in the legs " on rising in the morning ; some had fever, but this, in the majority, was due to malaria. Experiments of feeding animals with *Lathyrus sativus* or *Vicia sativa* with which the former is usually mixed, have produced no real positive results unless vitamin A was deficient at the same time and there is evidence to support the view that lathyrism is " due to an active neurotoxin, the effects of which could be prevented by protective foods containing vitamin A and carotene, even when much of the toxic agent in *Lathyrus sativus* is consumed." This is largely borne out in the outbreaks referred to. The intake of vitamin A and carotene was low and the *khesari* was consumed for a long time and—this is important—families in the same areas with adequate vitamin A and less *khesari* showed none of the symptoms. No adequate explanation is offered for the much higher incidence among males. *H. Harold Scott*

PROTOZOOLOGY : GENERAL

CATHIE, I. A. B. & DUDGEON, J. A. **The Laboratory Diagnosis of Toxoplasmosis.** *J. Clin. Path.* 1949, Nov., v. 2, No. 4, 259–65, 3 figs. [20 refs.]

Laboratory investigations were carried out on a so-called case of congenital toxoplasmosis. The patient was a girl of 5 years with hydrocephalus accompanied by patches of cerebral calcification, pes cavus, and retino-choroiditis. Attempts to isolate the organism from the cerebrospinal fluid failed and the diagnosis was based on the results of the serological reactions. A neutralizing antibody was detected in the girl's serum by the rabbit skin method [this *Bulletin*, 1943, v. 40, 636] ; the method gave better results if the peritoneal fluid of infected mice was used instead of brain. The serum of the patient's mother gave an indefinite result. The complement fixing test of WARREN and RUSS [this *Bulletin*, 1948, v. 45, 1035] was next employed, with the use of these authors' antigen, and fixation was obtained in a 1/16 dilution of the patient's serum and in a 1/32 of the mother's. Lastly SABIN and FELDMAN's stain test [*Science*, 1948, Dec. 10, 660] was carried out with the use of certain

modifications because the original method failed to work. Four-day peritoneal exudate was mixed with an equal quantity of heparinized normal human serum. To this were added equal quantities of serial dilutions of the patient's serum, and the mixture was incubated in a water bath at 37°C. for 1 hour. Then, 0·25 per cent. methylene blue in *p*H 11 buffer (not less than 2 days, nor more than 14 days old) was added and counts of stained and unstained parasites were made after 10 minutes. A zone phenomenon occurred at the lower dilutions. The patient's serum gave a positive reaction up to a titre between 1/64 and 1/128 and the mother's up to 1/128. The toxoplasmin skin test gave a doubtful result.

It is stated that clinical details of this case will be given elsewhere.

P. C. C. Garnham

ENTOMOLOGY AND INSECTICIDES : GENERAL

British Museum (Natural History) Economic Ser. No. 4. 17 pp., 6 figs. **Mosquitoes and their relation to Disease.** 5th Edition. 1949. London : Printed by Order of the Trustees of the British Museum. [6*d*.]

British Museum (Natural History) Economic Ser. No. 4A. 27 pp., 4 figs. [10 refs.] **British Mosquitoes and their Control.** 3rd Edition. 1949. London : Printed by Order of the Trustees of the British Museum. [6*d*.]

Perry, W. J. **The Mosquitoes and Mosquito-borne Diseases of the Treasury Islands (British Solomon Islands).** *Amer. J. Trop. Med.* 1949, Sept., v. 29, No. 5, 747–58, 7 figs. [19 refs.]

The Treasury Islands form part of the Solomons group. Malaria is of primary importance and *Anopheles farauti* is present. Dengue has not been recorded, and though conditions are suitable for *Aëdes aegypti* this mosquito had not been introduced by 1945. A 0·7 per cent. blood infectivity rate for *Wuchereria bancrofti* was found among inhabitants in Falamai village ; no intermediary host revealed infective-stage larvae, but *Anopheles farauti* exhibited the highest incidence of developing larvae.

A six-month mosquito survey resulted in the finding of the following species : *Anopheles farauti*, *Culex annulirostris*, *C. fraudatrix*, *C. halifaxi*, *C. sitiens*, *Aëdes albolineatus*, *Aëdes albilabris*, *Aëdes quasiscutellaris*, *Armigeres breinli* and *Tripteroides solomonis*. Brief notes are given on taxonomy and biology, a key to fourth stage larvae is presented and the main morphological details are illustrated.

H. S. Leeson

Heilesen, B. **Studies on Mosquito Bites.** Reprinted from *Acta Allergologica*. Copenhagen. 1949, v. 2, No. 3, 245–67, 1 fig. [29 refs.]

The author presents observations on people who were bitten by *Aëdes aegypti*, in order to investigate their reactions. There were altogether 41 subjects, including 7 women and 10 children, and they were investigated in London and Copenhagen. Some had previously been exposed to this mosquito : as to those who had not one has to remember that other species of *Aëdes* occur in Northern Europe and frequently bite man. Several of the subjects of the experiment were bitten on many occasions, the observations extending over months.

The author's observations do not add a great deal to what was previously known. There is clearly much irregularity in the response of different individuals. In a few cases no reaction occurs after the first bite ("absolute anergy"): this seems to be characteristic of Danish children, and not very unusual in adults. Generally, however, the reaction to the first bite is a papule which comes up after a delay of about 24 hours. But when a person has been repeatedly bitten for a month or so he will exhibit an immediate weal, followed by the delayed papular reaction. It has been said that after prolonged exposure some individuals reach a stage in which they give no reaction. There is little evidence of that in the present experiments.

In the discussion it appears to be well established that the reactions are allergic. [See also this *Bulletin*, 1947, v. 44, 364.] *P. A. Buxton*

GEIGY, R. & GANDER, R. Aeussere Einwirkungen beim Schlüpfen von *Aëdes aegypti* aus dem Ei. [**External Influences on the Emergence of *Aëdes aegypti* from the Egg.**] *Acta Tropica*. Basle. 1949, v. 6, No. 2, 97–104, 4 figs. [15 refs.]

The English summary appended to the paper is as follows :—

"Compared with eggs of other mosquitoes the egg of Aedes aegypti shows an extraordinary high capacity of desiccation. If under normal conditions in nature or under experimental conditions in laboratory the moist medium on which the egg is deposited is desiccated, embryonic development will proceed without interruption under the egg shell and the young larva is formed after about 72 hours. Under the condition that the relative atmospheric humidity does not drop below 70%, the larva can resist to desiccation for about one year, but hatching is prevented. This inhibition may go on even if the egg comes into contact with water which is rich in oxygen. The hatching capacity of the Aedes egg is dependent on the oxygen content of the medium, whether it is water or air. If the oxygen content of the medium is reduced to one half approximately by reducing agents as vitamin C, pyrogallol, hydrochinon, sulphurous acid and others, the larva is capable of hatching after 10–20 minutes. It is even possible to provoke hatching of larvae in air on moistened filter paper after having desoxygenated the medium with reducing agents. The internal mechanism of this strange biological adaptation which is a great advantage for the propagation of the yellow fever mosquitoes in warm countries has not yet been detected. It is possible that osmotic phenomena are concerned, but there may also be a direct or indirect action upon the nervous or muscular system."

HASSETT, C. C. & JENKINS, D. W. **Production of Radioactive Mosquitoes.** *Science*, 1949, July 29, 109–10.

For several types of investigation one would be glad to mark living mosquitoes, in such a way as to recognize them on recapture. The authors have reared *Aëdes aegypti*, by familiar methods, adding radioactive phosphorus to the liquid. The beta radiation is easy to detect, and the half-life (14·3 days) of P32 is convenient : also the substance is not likely to be dangerous.

Experiments are described which determined the highest dosage which could be given without harm to the larvae. The "activity" of adults on day of emergence is recorded, and varies immensely : no facts are given as to loss of this activity during adult life.

It seems probable that the radioactive material is swallowed by the larvae : repeated washing does not remove it. Exposure of pupae produces adults with a very low dosage. *P. A. Buxton*

MACKERRAS, I. M. & MACKERRAS, M. J. **Revisional Notes on Australasian Simuliidae (Diptera).** Reprinted from *Proc. Linnean Soc. New South Wales.* 1949, v. 73, Pts. 5/6, 372–405, 20 figs. [24 refs.]

This is not a full monographic treatment of the Australian Simuliidae but is an illustrated systematic account of the known species of *Cnephia*, *Simulium* and *Austrosimulium*. The authors give keys to the identification of females, males and larvae, and a distribution table, and they indicate directions in which immediately profitable work might be undertaken. *H. S. Leeson*

BOURGAIN, M. Présence de *Phlebotomus* (*Larroussius*) *arlasi* Tonnoir, 1921, dans les Basses-Pyrénées. [**Presence of** *Phlebotomus* (*Larroussius*) *arlasi* **Tonnoir, 1921, in the Basses-Pyrenées.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 11/12, 562–3. [13 refs.]

The following is a translation of the author's summary :—

Phlebotomus (*Larroussius*) *arlasi* Tonnoir has been collected at Rébénacq in the neighbourhood of Pau. The Basses-Pyrenées should therefore be regarded as one of the areas in the geographical distribution of this species of *Phlebotomus* in continental France. *H. J. O'D. Burke-Gaffney*

BOURGAIN, M. Présence de *Phlebotomus* (*Larroussius*) *arlasi* Tonnoir, 1921, et de *Phlebotomus* (*Larroussius*) *perniciosus*, Newstead, 1911, en Gironde. [*Phlebotomus* (*Larroussius*) *arlasi* **Tonnoir 1921 and** *Phlebotomus* (*Larroussius*) *perniciosus* **Newstead 1911 in the Gironde.**] *Bull. Soc. Path. Exot.* 1949, v. 42, Nos. 11/12, 564–5.

The following is a translation of the author's summary :—

Phlebotomus (*Larroussius*) *arlasi* Tonnoir and *Phlebotomus* (*Larroussius*) *perniciosus* Newstead have been collected at Bonnetan in the neighbourhood of Bordeaux.

The Gironde should therefore be regarded as one of the areas in the geographical distribution of these two species of *Phlebotomus* in continental France.

Two abnormalities in the wings of *P. arlasi* are reported and one in the posterior ducts of the spermatheca of *P. perniciosus*.

H. J. O'D. Burke-Gaffney

KIRK, R. & LEWIS, D. J. **Taxonomy of the Ethiopian Sandflies** (*Phlebotomus*). **IV.** *P. bedfordi* **Newstead and** *P. antennatus* **Newstead.** *Ann. Trop. Med. & Parasit.* **1949, Dec., v. 43, Nos. 3/4, 333–6, 1 fig.**

BRITISH MUSEUM (NATURAL HISTORY) ECONOMIC SER. No. 3. 18 pp., 7 figs. **Fleas as a Menace to Man and Domestic Animals : their Life-History, Habits and Control.** 6th Edition. 1949. London : Printed by Order of the Trustees of the British Museum. [6*d*.]

MÜLLER, F. P. Das Zahlenverhältnis der Geschlechter in Zuchtpopulationen der Kleiderlaus (*Pediculus corporis* de Geer, Anoplura). [**The Ratio of the Sexes of Body Lice** (*Pediculus corporis*) **in Culture.**] *Ztschr. f. Parasitenk.* 1949, Dec. 31, v. 14, No. 4, 285–99, 5 figs. [12 refs.]

The author has investigated the sex ratio in two strains of body louse maintained in culture in the laboratory. He ascribes the deviations from the expected 1 : 1 ratio to intrinsic and extrinsic causes, genetic and environmental respectively.

There is an innate tendency, presumably inherited, to produce a greater number of males than females. The author supposes that this is due to one of his strains having an admixture of head louse. He refers to the work of GOLDSCHMIDT on inter-racial crosses in *Lymantria dispar* as showing that a disturbance of the sex ratio may result from such crossing. There is also the possibility that lethal combinations may occur.

The principal extrinsic factor is nutritional. Cultures of lice which are fed less often have a higher proportion of females. The author shows that this is due to a greater mortality among male nymphs, which are more susceptible than females to starvation. When nymphal mortality is at a minimum the sex ratio, male to female, may be as high as 2 : 1. *J. H. Sudd*

KARTMAN, L. **Preliminary Observations on the relation of Nutrition to Pediculosis of Rats and Chickens.** *J. Parasitology.* 1949, Aug., v. 35, No. 3, 367–74, 2 figs. [14 refs.]

It has often been said that animals in " poor condition " become lousy, and clearly the relation between host nutrition and infestation might prove to be important.

The present author studied numbers of lice (*Polyplax*) on laboratory rats, infesting the animals deliberately and estimating the results later. Groups of rats were deprived of various vitamins. The number of rats was small, and the individual scatter is not estimated. The results of these experiments, and those of GYÖRGY and others might perhaps be due to lack of activity and " grooming " in rats which were in a poor physical state, rather than to any avitaminosis.

Rather similar work was carried out with chickens, some of which had the upper part of the beak shortened, which resulted in an increase of mallophagan lice (*Eomenacanthus*). A group of birds suffering from severe malnutrition had fewer lice than the controls : this unexpected result was observed both in " debeaked " and other birds. The method of sampling the lice does not appear to have been critical. *P. A. Buxton*

LAWRENCE, R. F. **The Larval Trombiculid Mites of South African Vertebrates.** Reprinted from *Ann. Natal Museum.* 1949, Oct., v. 11, Pt. 3, 405–86, 48 figs. [33 refs.]

JENKINS, D. W. **The Ecology and Laboratory Rearing of Chiggers affecting Man in the United States (Acarina, Trombiculidae).** Reprinted from *Abstracts of Doctoral Dissertations.* Ohio State University Press. 1947, No. 56, 75–80, 1 fig.

Harvest mites (larval Trombiculidae) are a major pest in the U.S.A., and might assume medical importance if scrub typhus were introduced. The author presents studies on their habits.

He has maintained colonies of *Eutrombicula alfreddugesi, batatas* and *masoni* over several generations and produced very large numbers for experimental studies. This is a fine achievement, because the larvae require conditions so different from those which suit the adults. In the laboratory the larvae are generally fed on box turtles (*Terrapene*), the nymphs on large numbers of *Aëdes* eggs. The life cycle in the laboratory occupies some 50 to 70 days.

A number of observations on larval movements and behaviour are recorded. *P. A. Buxton*

PICKETT, A. D. **A Critique on Insect Chemical Control Methods.** Reprinted from *Canadian Entomologist.* 1949, Mar., v. 81, No. 3, 10 pp., 1 fig. [11 refs.]

In an interesting survey of pest control methods, the author criticizes the narrow "compartmentalized" outlook of many applied entomologists. Such men have taken too narrow a view of their problems, which have been simplified to merely destroying insect pests with more and more active insecticides, applied by more and more efficient apparatus. It is seldom that any one takes a sufficiently long-term view to realize that many agricultural pests, which were comparatively rare or unimportant in the past, have now developed into major troubles requiring much attention. Vigorous chemical attacks on any particular pest can virtually eliminate it from a crop; but other pests develop in its place, with the result that far more money and time is now spent on insect control than formerly.

A sounder attitude on pest control will take into account the delicate natural balance between a pest and its parasites, predators and competitors. The effects of indiscriminate use of fungicides or insecticides may actually favour some pests. Thus, the oyster-shell scale has become a pest only since about 1930 because of widespread use of sulphur washes which destroy its parasite and predator. Similarly with the red mite and codling moth in orchards. On the other hand, vigorous attacks on the codling moth may eliminate it in favour of leaf rollers or mites.

Another effect of widespread use of chemical control methods is the possible build-up of toxic residues in the soil. This should be carefully anticipated.

The author urges that the correct attitude is not to abandon all insecticides, but to use them with careful consideration of all ecological factors and their possible effect on the biological balance. [Fortunately, these difficulties do not often refer to insects of medical importance, the numbers of which are not mainly regulated by parasites and predators. It should be remembered, however, that widespread applications of DDT, *e.g.*, to control mosquitoes, may upset the balance of insects of agricultural importance, or fish and other wildlife.]

J. R. Busvine

LABORATORY PROCEDURES

REES-WRIGHT, W. **A further Note on Mounting Media for Parasitological Materials.** *Ann. Trop. Med. & Parasit.* 1949, Dec., v. 43, Nos. 3/4, 373.

In 1927, the author recommended euparal as a mounting medium for stained blood films (Leishman) and a similar type of mountant for arthropods and suchlike material [this *Bulletin*, 1928, v. 25, 253]. He has had an opportunity of examining some of these preparations after some 20 to 25 years. Blood films containing *P. vivax* and *T. rhodesiense* mounted in 1925 were in excellent condition and showed details clearly. The camphenol-sandarac medium has not been so satisfactory. Stained cercariae and rediae of *Fasciola hepatica*, mounted about 1927 showed marked deterioration. Though the carmine stain was still satisfactory, the mountant had become white and opaque and crystals (probably of camphor) had separated in the clear part. These conditions might be prevented by ringing the coverslips with a cement and reducing the amount of camphor used: but nevertheless the medium cannot be regarded as being suitable for permanent mounts. The author adds that when he parted with these slides in 1938, no signs of crystallization had been visible, though in some cases there was a little deterioration at the margins of specimens.

H. J. O'D. Burke-Gaffney

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

McNair, P. K. & others. **Report of a Medical Survey of the Yap District of the Western Caroline Islands of the Trust Territory of the Pacific Islands.** *Hosp. Corps Quarterly* (*Suppl. to U.S. Nav. Med. Bull.*). 1949, Nov., v. 22, No. 4, 5–19, 4 figs.

Little is known of the medical conditions of the Western Caroline Islands, and the investigation made by this group of men from the medical department of the U.S. Navy, between 21 February 1949 and 12 May 1949, is therefore welcome.

The islands are in the " malaria-free " area of the Pacific, and, except Yap, are coral atolls ; the Yap islands are bigger, and some of the hills reach 500 feet. The climate is warm and humid. The people are Micronesians, and the total population of the 12 islands visited was 4,405. Their economic and educational status is low, their sanitation customs are poor. Diet consists of banana, papaya, breadfruit, coconut, taro, sugar-cane, pineapple, and fish (which is abundant). Chickens and pigs are raised in small numbers. No case of frank nutritional deficiency was seen, though sub-clinical states probably exist.

The people were tested with tuberculin, and by miniature radiography. Of the 4,405 persons, 89 per cent. were given the tuberculin test, and 59·2 per cent. of these were positive. Mass radiography was used in 3,631 people (82 per cent.) ; 77 cases of active pulmonary tuberculosis and 80 of suspected tuberculosis were found in addition to 22 of lymph glands and 2 of bone. The tuberculin rates rise to over 70 per cent. at ages over 50, and in Yap itself, when first and second strengths of PPD were used, the proportion was 95 per cent. As in other tropical countries, therefore, the morbidity rate is high, but the majority of infected persons cope with the infection.

Yaws is common but it is difficult to decide which of the many skin lesions are in fact the result of that disease. Filariasis exists on some islands, where *Culex quinquefasciatus* [*fatigans*] is found. There were 52 cases of leprosy in the leprosarium on Tinian Island. The most prevalent intestinal parasites were *Trichuris* and hookworm. Skin diseases included over 1,400 cases of tinea versicolor and 29 of tinea imbricata.

Eye diseases were common, especially chronic conjunctivitis probably due to wind-blown coral.

Chewing of betel nut is universal, and one case of squamous-cell carcinoma of the cheek was seen in a person addicted to it. *Charles Wilcocks*

BOOK REVIEWS

Boyd, Mark F. [Edited by]. **Malariology. A Comprehensive Survey of all Aspects of this Group of Diseases from a Global Standpoint.** By Sixty-Five Contributors. Vol. I. pp. xxi+1–787 & Vol. II. pp. vi+788–1643, 436 text figs. & 4 figs. on 1 pl. 1949. Philadelphia & London : W. B. Saunders Company. [£8 15*s*.]

This monumental work will be warmly welcomed by malariologists throughout the world. The Editor's aim was to produce a working manual of malariology, a comprehensive survey of all available knowledge relating to malaria, objectively presented and brought down to date. As stated in a foreword by Sir Rickard Christophers, the advances made in recent years in

almost every aspect of malaria research and control have been so many and so far reaching that the fulfilment of this object in its entirety would be beyond the capacity of any one individual, and the work under review includes articles by no less than 65 contributors, each one an authority in the particular aspect of the disease with which he deals. No one is more fitted to undertake the onerous task of Editorship than Dr. Mark Boyd, not only because of his own lifelong study of malaria problems, but also by reason of his experience as a medical historian and as editor of a scientific journal.

The work is presented in two handsomely bound volumes, profusely illustrated with photographs, charts and graphs, although many will regret that it has not been possible to include reproductions of the various species of *Plasmodium* in colour. A bibliography is appended to each chapter, and there is an author index and a subject index, at the end of the second volume. There are five sections, the first a historical review by the Editor and the remaining four dealing respectively with parasitology, definitive hosts, the intermediate host and measures of control and eradication.

To subject the entire work to detailed critical analysis would need a volume in itself, and the reviewer must of necessity confine himself to giving a general account of its scope and calibre, picking out certain points of interest for more particular comment.

Parasitology

The opening chapter in this section contains a catalogue of the genus *Plasmodium* and an index of their hosts by R. G. Coatney and R. L. Roudabush. This is followed by an account of the life-cycles of malaria parasites with special reference to the newer knowledge of pre-erythrocytic stages by C. G. Huff, whose noteworthy researches on avian plasmodia have shed so much light on this subject.

The human parasites of the genus *Plasmodium* are reviewed by Emile Brumpt. Descriptions are given of the four generally recognized species, *falciparum*, *malariae*, *vivax* and *ovale*, and also of *P. wilsoni*, on the validity of which final judgment is withheld. The author follows the view now generally accepted that *tenue* is not a valid species, but is synonymous with *falciparum*. Attention is drawn to the paucity of records of *P. ovale*, as contrasted with its apparently world-wide distribution. Of 111 records cited, 93 are from Africa, the remainder being scattered among places as far apart as the Philippine Islands, New Guinea, New Britain, India, China, Palestine, Greece, Venezuela and Colombia. From most of these locations, however, only a single case has been reported and records of this species of parasite from localities outside the African continent should be accepted with reserve in the absence of confirmatory evidence.

Referring to the view put forward by certain writers that malaria parasites do not penetrate the red blood cells but remain on the outer surface, Professor Brumpt cites the work of Radcliffe, who concluded from a series of precise cytological studies that the erythrocytic stages of *P. falciparum* are endoglobular. As regards *P. vivax*, he remarks that an intracorpuscular location for gametocytes appears indubitable, but that a similar conviction with respect to trophozoites is difficult to entertain. The work of Wolpers with the electron microscope appears to prove that, while growing, the parasite clings to the membrane of the red cell with pincer-like pseudopodia. Professor Brumpt, however, believes that the merozoites penetrate directly into the red blood cells.

Reference is made to the curiously sporadic distribution of quartan infections in countries where a single species of *Anopheles* transmits all species of human malaria parasite, as well as in those where several species of vector

Anopheles exist. It was this phenomenon and the difficulty generally experienced in infecting *Anopheles* experimentally with *P. malariae* that prompted Marchoux to speak of the "quartan fever mystery". But, as Professor Brumpt pertinently remarks, mystery is not restricted to quartan malaria; there is, for instance, also a "benign tertian mystery", since in tropical Africa regions exist where there are efficient anopheline carriers of *P. vivax*, but where this parasite has never been found despite careful search of great numbers of blood smears. The work went to press before the description of the pre-erythrocytic phase of *P. vivax* and *P. falciparum* was published, but microphotographs of pre-erythrocytic schizonts of *P. cynomolgi* in a monkey's liver and of *P. vivax* in a human liver, contributed by H. E. SHORTT, are reproduced as a frontispiece to Volume I.

The greater part of chapter 8 is the work of M. F. BOYD, and deals with the microscopical diagnosis of malaria parasites in blood smears, infection in *Anopheles* mosquitoes and biochemical diagnostic tests; Sir Rickard CHRISTOPHERS contributes a note on the enumeration of malaria parasites and L. T. COGGESHALL discusses certain serological tests for which diagnostic significance has been claimed. Dr. Boyd comments on the difficulty which may arise in diagnosis when smears are taken at the onset of a first infection, when a patient may have been reacting to submicroscopic densities of parasites for several days. He notes that, in *falciparum* infections, the larger parasites may have receded from the circulation at the time of the clinical onset, although they would have been detectable had a smear been fortuitously taken on the previous day, and will probably be discoverable on the day following. Hence a single negative examination does not exclude the possibility of a malarial infection as the cause of an acute illness, while reliable exclusion requires the absence of parasites from a series of smears taken on consecutive days for as long as a week, provided there has been no intercurrent administration of plasmodicidal drugs.

In an account of *in vitro* methods employed in the study and cultivation of plasmodia, Q. M. GEIMAN traces the evolution of such methods through three periods. The first (1880–1912) when many attempts at cultivation were made, but only survival was obtained; the second (1912–1941) initiated by the work of BASS and JOHNS, the most notable feature of which was the discovery that dextrose is an essential nutrient for plasmodia; the third and most productive dating from 1941, when the gravity of the malaria problem in certain of the combat areas resulted in the organization of a greatly extended programme in this field of research. The two main procedures developed during this period, the Rocker Dilution and Rocker Perfusion techniques, derived from a systematic biochemical study of the simian malaria parasite *P. knowlesi*, are described in detail. The latter part of the chapter is concerned with methods of cultivating the exo-erythrocytic stages of plasmodia, special reference being made to the work of HAWKING, which played so important a part in reversing the trend of results with tissue culture.

Definitive hosts

Sir Rickard CHRISTOPHERS opens this section with a chapter on the insect vectors of disease in general and of malaria in particular. He lays down the effective criteria for a vector under any given circumstance, specifies the most notorious of the vector *Anopheles* in various parts of the world and defines the procedure known as "species sanitation," which was based on the results of his own early researches in collaboration with the late Professor J. W. W. STEPHENS.

The morphology of *Anopheles* mosquitoes in their different stages and instars is described by H. S. LEESON and P. A. BUXTON, and the same authors

contribute a separate chapter on the life history of anophelines. Attention is drawn to various examples of the quantitative work which has been undertaken on different phases of mosquito biology, much of which is classed as useful but fragmentary. Emphasis is laid on the importance of the subject of population in relation to the epidemiology of mosquito-borne disease, since the entomologist cannot make his contribution to the study of the spread of disease until his way of thinking and his technique allow him to make quantitative studies on the numbers of the insect. " It would be of real value if an attempt could be made to obtain a quantitative knowledge of all aspects of the biology of a single species. The species selected should be one already well known and easy to recognize at all stages. It would be studied by experiments in the laboratory and by observations in the field, the work continuing for several years uninterruptedly . . . . An essential member of the team would be a statistician, who would be involved in the planning, and who should possess knowledge of demographic methods as well as of the statistical technics used in the analyses of experimental results."

The next two chapters deal with the physiology and ecology of *Anopheles* mosquitoes and are contributed by V. B. Wigglesworth and M. E. Bates respectively. The malariologist is interested in the physiology of mosquitoes for three reasons: (i) as a rational basis for the study of mosquito ecology; (ii) for the proper understanding of insecticidal action; and (iii) because the living tissues of the mosquito furnish the environment for the malarial parasite throughout its sexual cycle. Among the many points of interest mentioned in this chapter is the fact that although in the adult mosquito there is no tough peritrophic membrane such as exists in the larva, and no well developed oesophageal invagination, the blood in the stomach is surrounded by a very delicate pellicle, often closed behind like a sac, which is said to consist of chitin, and is probably the product of the general epithelium. The chapter on ecology covers a very wide field, and as the author points out the term " natural history " would perhaps be a more appropriate title. An intimate knowledge of the resting places, time of flight, longevity, flight range, seasonal distribution, food habits and habits of oviposition of the vector species of mosquito has become more than ever essential in view of recent observations on the action of residual insecticides, and in this respect Dr. Bates's contribution is especially valuable.

Methods for the detection and collection of imagines, ova, larvae and pupae, the preservation and despatch of entomological material, the insectary rearing of *Anopheles* and the determination of the source of mosquito blood meals by the precipitin test are described by G. H. Bradley and M. H. Goodwin. An article on the description and systematic study of mosquitoes and the preparation and use of keys for identification is contributed by Alan Stone.

There follows a series of chapters on the anophelines of particular regions, the Nearctic species being dealt with by S. B. Freeborn, the Neotropical by John Lane, the Palaearctic by M. E. Bates, W. M. Beklemishev and Lidia La Face, the Ethiopian by B. de Meillon, the Oriental by I. M. Puri and the Australasian by W. V. King. Luis Vargas contributes a chapter on culicine and aedine mosquitoes and the malaria infection of lower animals. The section ends with a description of the various techniques employed for the study of simian malarias, by R. J. Porter, and of those applicable to the experimental infection of birds, by R. Hewitt.

Intermediate host

The first half of this section is concerned with epidemiology, which, as defined by the Editor, is in fact a consideration of the natural history of disease. Dr. Boyd himself contributes the two opening chapters. In the first he discusses

the source of infection, incidence in relation to climate and season, intrinsic incubation period, susceptibility and immunity of the intermediate host and a number of demographic variables. Among the many points examined is the effect of dosage of sporozoites on the incubation period and on the character of the clinical attack. That the former can be shortened down to, but not within, a limit determined by the length of the pre-erythrocytic stage of the parasite by increasing the dosage of sporozoites is beyond dispute ; the effect, if any, of dosage on the clinical attack is still undetermined, though certain observations recorded by the author in the course of his work on malaria therapy suggest that its duration varies directly with the dose of sporozoites and inversely with the length of the incubation period. Other matters discussed include the functions of the spleen, the correlation of splenomegaly and demonstrable parasitaemia, the reaction of the spleen to the different species of parasite and the epidemiological significance of the enlarged spleen in acute and chronic malaria. The studies of SCHÜFFNER, CHRISTOPHERS, Bagster WILSON and MACDONALD on the mechanism of infection with malaria of populations living under endemic and hyperendemic conditions are also subjected to critical analysis.

The second chapter deals with the blood meal of mosquitoes, the level of infectiousness of the donor, the extrinsic incubation period, susceptibility of anophelines to malarial infection, climate and season in relation to transmission, intensity of infection in anophelines, duration of anopheline infectiousness and a number of factors derived from anopheline ecology. A table is included listing the proved anopheline vectors of the world and the chapter ends with a discussion of the mathematical theories put forward by ROSS on the intensity of malaria transmission in relation to the endemic and epidemic prevalence of the disease.

Sir Rickard CHRISTOPHERS contributes a chapter on the endemic and epidemic prevalence of malaria, based largely on his own classical studies in hyperendemic areas in India and on his researches on the widespread regional epidemics which from time to time sweep over certain areas in north-west India and Pakistan. The world distribution of malaria and the recorded distribution of the different species of human *Plasmodium* are reviewed by L. W. HACKETT.

An interesting account of malaria transmitted by bromeliad-breeding anophelines of the sub-genus *Kerteszia* is given by W. G. DOWNS and C. S. PITTENDRIGH. This problem is of importance in Trinidad, and in the states of Santa Catarina, Paraña and São Paulo in Brazil. It is possible that other areas of bromeliad malaria exist in other parts of South America, in Panama and in other Central American countries.

Malaria incidence in North America is reviewed by E. C. FAUST, in the West Indies and South America by A. GABALDON, in Northern Europe, the Mediterranean and Near East by L. W. HACKETT, in Central and South Africa by D. B. WILSON, in the Far East by G. COVELL, and in Australia and the South Pacific by S. M. LAMBERT. A valuable chapter on the scope and conduct of malaria surveys is contributed by M. F. Boyd, Persis PUTNAM and S. R. CHRISTOPHERS.

The pathological anatomy of malaria is discussed by H. C. CLARK and W. J. TOMLINSON, the data presented being largely derived from patients dying in the vicinity of the Panama Canal. The records include those of 405 deaths directly attributable to uncomplicated *falciparum* infections. Much discussion has centred round the question of cerebral capillary thrombosis, plugging or blocking, as mentioned in older descriptions and in some modern publications. The authors found no satisfactory evidence of intravascular thrombosis, erythrocytic, parasitic or pigment agglutination, and consider it doubtful if

true embolic phenomena can be a prominent factor in the production of cerebral or other lesions. The same subject is discussed in a chapter on the physiological pathology of malaria, by J. D. FULTON and B. G. MAEGRAITH. These observers believe that intravascular agglutination is a common phenomenon in different types of malarial infection, and that anoxaemia resulting in disturbed tissue respiration is responsible for many of the sequelae of the disease. They refer to the belief expressed by some writers that a toxin liberated by the parasite gives rise to many of the pathological conditions in malaria, but note that no proof of the existence of such a toxin has been established either by *in vivo* or by *in vitro* experiment. Among the many matters of interest discussed in this chapter are the alleged influence of malnutrition on the incidence and severity of malaria and the effect of the disease on the functions of the liver, kidney, adrenal glands and haemopoietic system.

The subject of malarial immunity is dealt with by W. H. TALIAFERRO, who defines the term broadly to include all mechanisms of the host which combat the invasion, multiplication and metabolic activities of the parasite, as well as repair the damage done by it. It is impossible in this review to do justice to this masterly exposition of so complex a subject. There are still a number of gaps in our knowledge, notably in regard to the nature of the antigens involved in acquired immunity to infection. The differences which have been demonstrated in the action of such immunity on tissue and blood forms of malaria parasites suggest the existence of different antigens operating against each stage. In this connexion it is stressed that no matter how important tissue stages may be in initiating the infection and in maintaining it during latency, immunity to blood stages is still important. Thus, exo-erythrocytic stages cannot institute a relapse if immunity against the blood stages is solid enough to destroy the parasites as they enter the blood stream.

The symptomatology of malaria in respect of infections with *falciparum*, *malariae* and *vivax* is reviewed in great detail by S. F. KITCHEN, in an account based largely on the author's own wide experience gained in the practice of malaria therapy. He notes that the greatest obstacle in the differential diagnosis of *falciparum* malaria is its well known attribute of clinical mimicry. The various disease groups for which this form of malaria may be mistaken are specified and reference is made to a number of surgical conditions which have been simulated from time to time by plasmodial infections. In the chapter on quartan malaria, comment is made on the extraordinary length of time, sometimes exceeding two decades, during which the infection may lie dormant, a phenomenon which has been emphasized in recent years by a number of instances of infections incurred by recipients of blood transfusion. Although remissions occur in the course of quartan attacks, the author has encountered no instance of renewed clinical activity after a quiescent period exceeding 53 days. The account of *vivax* malaria includes an interesting discussion on latency and relapse, which, despite recent advances in our knowledge of the life cycle of the parasite in the human host, still present a number of features which are as yet not adequately explained.

The symptomatology of *ovale* malaria is appropriately dealt with by the late S. P. JAMES, W. D. NICOL and P. G. SHUTE, whose investigations at Horton Hospital were instrumental in establishing that the peculiar morphological characters of the parasite, the periodicity of its asexual cycle in man and its clinical effects are not changed or modified after passage through the insect host. The validity of this parasite as a distinct species was further confirmed by certain characters of the developing oöcyst, which render it easily distinguishable from those of the other human malaria parasites.

An account of the aetiology, pathology, morbid anatomy, symptomatology and treatment of blackwater fever is given by E. I. SALISBURY. The exact

mention of this condition still remains obscure, but it is generally accepted that malaria, especially *falciparum* malaria, and predisposition are constant factors, whilst the variants are probably many. Haemolysis not often follows the administration of drugs or changes in body resistance for these factors to be entirely ignored.

The next three chapters are devoted to the chemotherapy of malaria, the first dealing with the neobiotic alkaloids and the various synthetic antimalarials by L. F. Cavenessia and Branch Craige, the second with the drug prophylaxis of malaria by J. S. Severo, and the third with the treatment of patent infections by M. S. Dunn. This subject is treated in great detail but the progressive advances constantly taking place in this field make it impossible to keep fully abreast of the most recent developments in a work of this magnitude. The view expressed that intravenous injection of quinine is not justifiable under any circumstances is likely to evoke considerable criticism. The section is concluded with a well balanced account of induced malaria as a therapeutic agent by F. D. Bruce.

Control and eradication

This section is introduced by Sir Malcolm Watson with a review of the general considerations involved in the control and eradication of malaria, including some interesting references to the author's own pioneer work in Malaya. This is followed by an all too brief chapter on species sanitation and species eradication for the control of mosquito-borne disease by F. L. Soper. One could wish that this author could have been persuaded to give a more detailed account of his own outstanding achievements in this field.

E. F. Knipling writes on mosquito repellents, R. B. Watson on methods of personal protection and the screening of dwellings, F. C. Bishopp on imagicides and larvicides, W. C. Earle on trapping methods and mosquito detection and E. B. Williamson on nonmalaric methods of control. The various aspects of antimalaria drainage are ably treated by such authorities as E. H. Malone, F. W. Knipe, N. H. Fletcher, W. Tisdale, D. B. Lee and C. C. Kizer. The last of these chapters includes a description of the methods of water management for mosquito control undertaken in connexion with the Tennessee River Valley development project. In view of the paramount importance attached to the spray-killing of adult mosquitoes as the chief and often the sole measure employed in many modern malaria campaigns, it is remarkable that only 18 pages are devoted to this subject, whilst no less than 80 are taken up by descriptions of drainage methods.

The applicability of various control measures in the Nearctic Region is discussed by J. M. Andrews, in the Neotropic Region by A. Carvalho, in the Palaearctic Region by L. W. Hackett and S. Mesghinian, in Central and South Africa by D. B. Wilson, in the Oriental Region by G. Covell, in the Australasian Region by E. Fiset and in the United States Army by J. S. Simmons. In the concluding chapter the Editor lays down the principles involved in the organization and planning of malaria control on a regional scale, special emphasis being laid on the necessity of establishing at least one centre for instruction in malariology in each formal division.

The foregoing account will give some indication of the scope and quality of the work under review. It can be stated without reservation that the Editor's aim, as set out in the foreword, has been abundantly fulfilled. Boyd's *Malariology* will find a place on the bookshelves of every institution concerned with malaria and its control. It should also be made available to every individual engaged in field or laboratory studies of the disease and also to those concerned with malaria problems in an administrative capacity.

Gordon Covell

CUBA. **Memoria del V Congreso Internacional de la Lepra celebrado en la Habana, Cuba del 3 al 11 de abril de 1948 organizado por el Gobierno de la Republica de Cuba con la colaboración de la Asociación Internacional de la Lepra.** [Fifth International Congress on Leprosy, Havana, Cuba, 1948.] 1322 pp., numerous illustrations. 1949. La Habana: Editorial Cenit, Belascoain No. 963.

The belated appearance of this report is accounted for by the mass of material to be printed in this bulky volume, bound in a paper cover and containing 1,322 pages and many illustrations, including photographs of the members of various committees.

The first 59 pages are occupied by a preface and photographs and a list of papers, which is repeated in a slightly different form, but with paging, at the end. A large proportion of the papers are in Spanish without summaries in any other European language. As summaries of the work were published in the *Internat. J. Leprosy* of April–June, 1948, with reports of some of the more interesting papers, as a Havana Congress Number, and summaries also appeared in *Leprosy Review* and in *Leprosy in India*, both of July, 1948 [this *Bulletin*, 1949, v. 46, 52] only a brief account of this volume is now required.

The most important part under the heading *Informes de las Comisiones* consists of short summaries in Spanish and English of the conclusions, under different headings, with notes of the discussions by members after each: these occupy pp. 62 to 95, and are followed by the papers at length.

Therapy.—The sulphones are considered to be the drugs of election and they are advised in moderately severe or advanced lepromatous cases, especially those with lesions of the nose and throat. The dosage of the different sulphones is next dealt with and the usual methods of dealing with anaemia are given and their toxicity discussed. Derivatives of hydnocarpus oil are effective in lepromatous leprosy, with maximum benefit when used in adequate and regular doses, such as 15 to 23 cc. of the oil weekly, but with reduced doses during reactions. Supplementary measures are enumerated and further research is advised on the use of para-aminosalicylic acid, sodium sulphoxylate, streptomycin, etc. Emphasis is laid on the possible advantages of combining the use of sulphones with hydnocarpus preparations or with effective antibiotics. The control of sulphones, etc., was also considered.

Classification and nomenclature.—The South American division into lepromatous, tuberculoid and indeterminate (undifferentiated) was discussed with the usual differences of opinion.

Epidemiology and Control.—Leprosy surveys and censuses to determine the extent of the problem in different countries, together with treatment and the aid of permanent "skin" dispensaries and travelling clinics, are advised. For control, infective cases only should be segregated and the uninfective kept under observation. Agricultural colonies are best for isolation, or sanatoria, with one physician for every 200 patients if possible. Dispensaries or out-patient clinics are of fundamental importance for the control of leprosy: they should be concentrated in areas of greatest density of population for the purposes of finding and segregating infective cases; the control of suspects and contacts; the removal to preventoria of children of infectious parents; and their periodical examination for the appearance of early symptoms. The legal requirements are also enumerated on modern lines and education and propaganda emphasized, including the avoidance as far as possible of the word "lepers". A brief section on social assistance concludes this useful summary of the work of the conference.

This well-produced and well-illustrated report will be of interest for reference to those actively engaged in antileprosy work and especially to those with a

knowledge of Spanish. If furnishes a good review of the present position of the leprosy problem without containing any startling advances. When it is contrasted with the proceedings of the Strassburg International Leprosy Congress of 1923 the slow, but steady, adoption of modern methods, based on the attractive powers of gradually improved treatment of leprosy, accentuated by the discovery of the more effective treatment of infective lepromatous cases by the sulphones, will be evident and the improved outlook for sufferers from this disfiguring and incapacitating disease will be appreciated.

L. Rogers

HARANT, Hervé & DUC, Nguyên. **Pathologie Exotique.** [Tropical Pathology.] Préface de G. LAVIER. pp. xviii+274. 1948. Paris: Librairie Maloine, 27 Rue de l'Ecole-de-Médecine. [7*s*. 6*d*.]

In spite of its title this little manual is not concerned with pathology but with the aetiology, diagnosis and treatment of tropical diseases.

It is a marvel of successful compression and little of note in the field of tropical medicine has been left out.

The information given is for the most part accurate and up to date, but as the book was published in 1948 there is no mention of the newest antibiotics such as chloramphenicol.

The inclusion of sea sickness as a climatic disease is surprising, but after all logical, for it is probably the first disease to confront the practitioner on his way to the tropics.

The authors do not accept as proven the rôle of game as reservoirs of *Trypanosoma rhodesiense*. The work of CORSON and others in Tanganyika Territory should have brought conviction in this matter.

In spite of the compression necessary in a précis of this kind the book is eminently readable and it was refreshing to come across little items of rare and curious knowledge such as the reference to malaria in Homer or the use of salt by a military engineer of Caesar to make marsh water inhospitable to mosquitoes. The volume is one of "*Les Petits Précis*" series directed by A. Cantonnet and published by the Librairie Maloine. It is noted that over 70 such manuals dealing with medical subjects have appeared or are in course of preparation.

H. G. Calwell

SHAFAR, J. [M.D., M.R.C.P., D.P.H.] **The Vitamins in Medical Practice.** pp. 9+383. 1949. London: Staples Press Ltd., Mandeville Place. [25*s*.]

This is a most useful book, particularly for anyone having to treat malnourished people and wanting to do so intelligently. The author has achieved something that is long overdue; a careful appraisal of present knowledge of the vitamins from the standpoint of the physician.

The first third of the book provides a necessary background in summarizing the main scientific facts about the vitamins; their chemistry, the metabolic and pathological changes produced by their deficiency in animals and man, methods of assay, principal food sources and what is known of their requirements in man. Two short chapters deal with the effects of food processing on vitamins, and their pharmacological properties. Thereafter the author adopts the sensible course of describing the classic deficiency diseases (beriberi, pellagra, scurvey, rickets and the like) as clinical syndromes in which the various aetiological factors are well discussed. This is a refreshing change from the normal textbook practice of putting beriberi under a heading labelled "vitamin

B_1" and pellagra under "nicotinic acid", thus giving the erroneous impression that a single vitamin deficiency is the sole cause of these syndromes; as the present author rightly points out, both are the result of multiple deficiencies.

The second half of the book will be of most interest to physicians in Britain; it deals with the use of vitamins in infancy and pregnancy, and in various disorders of the digestive tract, liver, blood, skin, nervous system, cardiovascular system and in infectious diseases. In this valuable symposium the author shows remarkable judgment in weighing the over-optimistic reports of enthusiasts for vitamin therapy in a large variety of diseases, against the more sober, but less spectacular, accounts of careful observers who have failed to confirm them. For instance he rightly states that "the few encouraging reports on the value of vitamin E in muscular dystrophies are far outweighed by the negative results" and, in discounting the alleged value of vitamin B_1 in nutritional polyneuropathy: "a neurological disturbance arising from a nutritional deficiency in the human is never due to the lack of a single essential nutrient."

The reader will find many useful references in this book to the sane, as well as to the sensational, literature on the medical uses of vitamins. Indeed the large list of references cited, 1,685 in all, adds importantly to the value of this book. Few people could find time to study them all and, since the author has quite obviously done so, or at least effectively evaluated them, he has saved the average reader an immense amount of toil in struggling through the vast and dispersed literature on the subject.

A last-minute addendum brings the book up to date as far as 1948, with references to vitamin B_{12} and other subjects. It is inevitable that in an attempt of this kind to condense and clarify so much new information, a few minor errors have crept in; for instance (page 77) the effect of surgical operations on the capillaries is described as an increase in fragility, whereas in fact they cause an increase in resistance. But in general, the text is particularly accurate, and the selection of literature for review is remarkably well chosen.

Although this book contains nothing that has not been said before, much of it has never been said so concisely and with such complete documentation. It is perhaps rather too detailed and too scholarly for the general physician in Britain who now has few nutritional problems; but for specialists in human nutrition and, particularly, for doctors working in countries where vitamin deficiencies are endemic, this book will be invaluable—to be read *in extenso* at least once, and then kept for reference. *A. P. Meiklejohn*

NETHERLANDS RED CROSS FEEDINGTEAM. **Report on Nutritional Survey in the Netherlands East Indies conducted during October 1945 till June 1946.** 119 pp., 7 figs. 1948. The Hague.

In September 1945 the Netherlands Red Cross sent out a Nutrition Research Team to the East Indies. The team consisted of eight persons, physicians and biochemists, each with experience of nutritional problems during the period of severe underfeeding in Holland at the time of the German occupation. The team began work in Java and neighbouring islands in October 1945, two months after the Japanese capitulation, on a fourfold task:

(*a*) To help and advise local authorities and medical officers in combating the after-effects of starvation among those who had been in concentration camps and prisoner-of-war camps;

(*b*) To study the pathology of nutritional diseases in the tropics, making use of their experience in Holland;

(*c*) To give help and guidance in the difficult task of combating malnutrition and dietary deficiencies among the indigenous people ;

(*d*) To advise numerous authorities about the feeding of various groups of people (camp occupants, soldiers, prisoners of war, etc.).

Their report gives an account of the main clinical and biochemical findings of the team during their stay in the East Indies. In the last five years there have been many descriptions of deficiency diseases by experienced individuals and research teams working in many parts of the world, and this report by the Dutch contains no new observations or findings. The experienced reader will be going over a familiar story. It is, however, the most clear and concise description of deficiency diseases that the reviewer knows and can be strongly recommended for students. Both the clinicians and the biochemists write with that conciseness and brevity that can only come from wide personal experience of their subject. The report discusses many difficult and debatable points with clarity and judgment. It should find a place in the nutritional section of all medical libraries throughout the British Commonwealth.

Unfortunately there is no note of the price or where the report can be obtained. Presumably the Netherlands Red Cross Society, the Hague, would provide information.

R. Passmore

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